MARINE REVIEW

WEEKLY.] AND MARINE RECORD. [ESTABLISHED, 1878.

Vol. XXVII

Eastern Office, 023 Maritime Bldg., New York City.
Chicago Office, 373 Dearborn St.

CLEVELAND, O., APRIL 30, 1903.

Published every Thursday at 39-41 Wade Bldg. by the Marine Review Pub. Co.

[Entered at Cleveland Post Office as second-class matter.]

Subscription $3.00 year.
Foreign $4.50 year.
Single Copy 10 cents.

No. 18

LAUNCH OF THE HAOULI.

Haouli, the steam yacht built at the Erie Basin, Brooklyn, N. Y., for F. M. Smith of San Francisco from the plans of Henry J. Gielow of New York, was launched last Saturday. This vessel is 211 ft. 3 in. over all, 166 ft. on the waterline, 21 ft. 6 in. beam, and will draw 9 ft. She will have a cruising speed of 20 miles an hour. She has a double bottom amidships and is divided into six watertight compartments. The engines are of the four-cylinder, triple-expansion type and will develop about 1,800 H. P. Steam will be supplied by four water-tube boilers. The two deckhouses, skylights and deck fittings will be of solid mahoganv and polished, and the saloon and staterooms will be finished in mahogany and enamel work, with gilding. The dining room in the forward deckhouse will have mahogany sofa and chairs of special design, which will be upholstered and covered with seagreen lavonia velour. The windows of this room will be draped with sea-green silk velour appliqued with Persian trimmings, and they will have sliding lace panels with the owner's private signal and the New York Yacht club burgee embroidered in white silk, while carpets to harmonize with these fittings and furnishings have been woven to order. In the social hall there will be settees and carved mahogany chairs upholstered in figured ivory silk damask, while the windows will have sliding lace panels, with the private signal and club flag embroidered in white silk, as in the dining room. These windows will be draped with olive silk velour, embroidered with special designs. The dressing room off the social hall will have handsome portieres, specially designed for the owner.

Below deck aft will be one large double stateroom, two large single staterooms, and three bathrooms. All the staterooms will have handsome mahogany bureaus, with bevel plate mirrors, large wardrobes, and roomy berths. The berths, bureaus, and sofas will be of polished mahogany, and the rest of the woodwork will be finished in white enamel paint and gilding. That part of the hull forward of the machinery, for a distance of 53 ft., will contain the quarters for officers, crew, storeroom, crew's galley, and a large refrigerating room and icebox. Two large bathrooms are provided, one for officers and the other for crew, and much thought has been given to make these quarters as comfortable as possible. The yacht will have a complete electric light plant, with storage battery searchlight and belt for illumination. Designer Gielow is superintending her construction, and it is expected that she will be ready for service July 1.

MORGAN AND CARNEGIE DEPART.

During the week Mr. J. Pierpont Morgan and Mr. Andrew Carnegie left for Europe. Both sailed on the same steamer, the Cedric of the White Star Line. Both were exhorted by a preacher on the deck of the vessel to pay attention to their immortal souls, to which, it is related, that they listened with an amused interest. International Mercantile Marine shares sagged at the departure of Mr. Morgan and there appears to have been no effort to support the market. Preferred dropped to 30⅜, a fall of 17 points, and common sunk to 10. The preferred is 6 per cent. cumulative and at the present market rate is equivalent to 20 per cent., providing, of course, dividends are paid. Nothing is known as to the purpose of Mr. Morgan's departure, but as the agreement between the International Mercantile Marine Co. and the British government is shortly to be presented to parliament it is surmised that Mr. Morgan desires to be on the ground. The real reason for the slump in ship securities is undoubtedly the overcapitalization of the company. The White Star vessels were purchased at several times their actual value, and dividends, if paid at all, must be paid upon the inflated price. Meanwhile the Cunard Steamship Co. has contented itself with a 4 per cent. dividend. This company has not yet placed the orders for the two express steamers which it is to build with the aid of the British government. It can find no ship builder willing to accept the onerous condition that if the steamship fails to average 25 knots for one full year, regardless of wind or weather, the vessel is to be rejected. This seems indeed a pretty stiff proviso. The Kaiser Wilhelm II., built to beat the Deutschland, has 40,000 H. P. On her maiden voyage she averaged a trifle under 23 knots. To bring her to the 25-knot standard it is estimated that her horse power would have to be increased by 30,000. Those last two knots are purchased at fearful price and it is doubtful if they are worth it.

A five-masted schooner, the Washington B. Thomas, was successfully launched a few days ago by Washburn Bros., Thomaston, Me. Her dimensions are: Length, 286.8 ft.; beam, 48 ft. 6 in.; depth, 22.7 ft. The frame is of solid Virginia oak. She has three houses and is fitted with every modern improvement.

NAVAL OFFICERS WATCHING A SMUGGLING CASE.

Naval officers are watching with interest the case of their brothers in the service who are under indictment on the charge of smuggling in Porto Rico. In fact, officers of the navy are sensitive to the somewhat widespread popular belief that they have special privileges and opportunities in the matter of smuggling. It is not true that they are wholesale smugglers; it is hardly true, indeed, that they are retail smugglers. They are like other citizens in their attitude on this question, with perhaps an extra conscientiousness because of their official relation to the government. Most naval officers in the course of duty in foreign parts buy a good many articles of value to be brought home for themselves, their families, or their friends. On most such articles they pay duty, but as they are able to buy cheaply they do not pay as much in duty as the ordinary citizen who imports articles. Doubtless naval officers do sometimes bring in dutiable goods on which they pay no duty. They usually buy citizens' clothing when abroad, and they are disposed, like the rest of mankind, to give themselves the benefit of every doubt in construing their privileges under the law. Every naval officer who smokes buys a good supply of tobacco when cruising in the West Indies. He has a right to buy as much as he will for his own use aboard ship, and to use it on the voyage and when he reaches home, so long as he is still attached to the ship. Technically he perhaps has no right to smoke such tobacco ashore, but when an officer lights his cigar just before leaving the Brooklyn navy yard to go over to New York, he naturally does not hunt up a customs officer in order to pay duty on the individual cigar. He probably gives such cigars to civilians visiting him aboard ship, and sometimes he yields to the temptation to carry off a box to present to a friend ashore. It is well-known that the ward room of an American man-of-war cruising in European waters is usually stocked with wines that never pay duty to the United States government. Such wines are consumed in the course of the voyage, and may also be consumed as the ship lies in port on this side of the water. They are not, however, smuggled ashore, and if the ship suddenly goes out of commission while there is yet a considerable stock of wines aboard, the wines are likely to be sold to the ward room mess of some outgoing ship of the navy.

Naval officers are not expected to be experts in the tariff laws. When they come from abroad on regular commercial ships, as they often do, they act exactly as other travelers act, and take their chances of paying what they must on whatever they bring in. Sometimes they have to pay heavy duties on articles which they hoped to bring in free. It often happens that a homecoming officer fetches along with him articles intrusted to him by some brother officer still abroad. A few years ago an officer returning from the Asiatic station with articles of a brother officer had to pay at San Francisco a round sum in duties on the goods of his friend. Such cases are rare, however, and officers are not often caught in an unmistakable attempt to defraud the government of duties.

RACE IN BUILDING BATTLESHIPS.

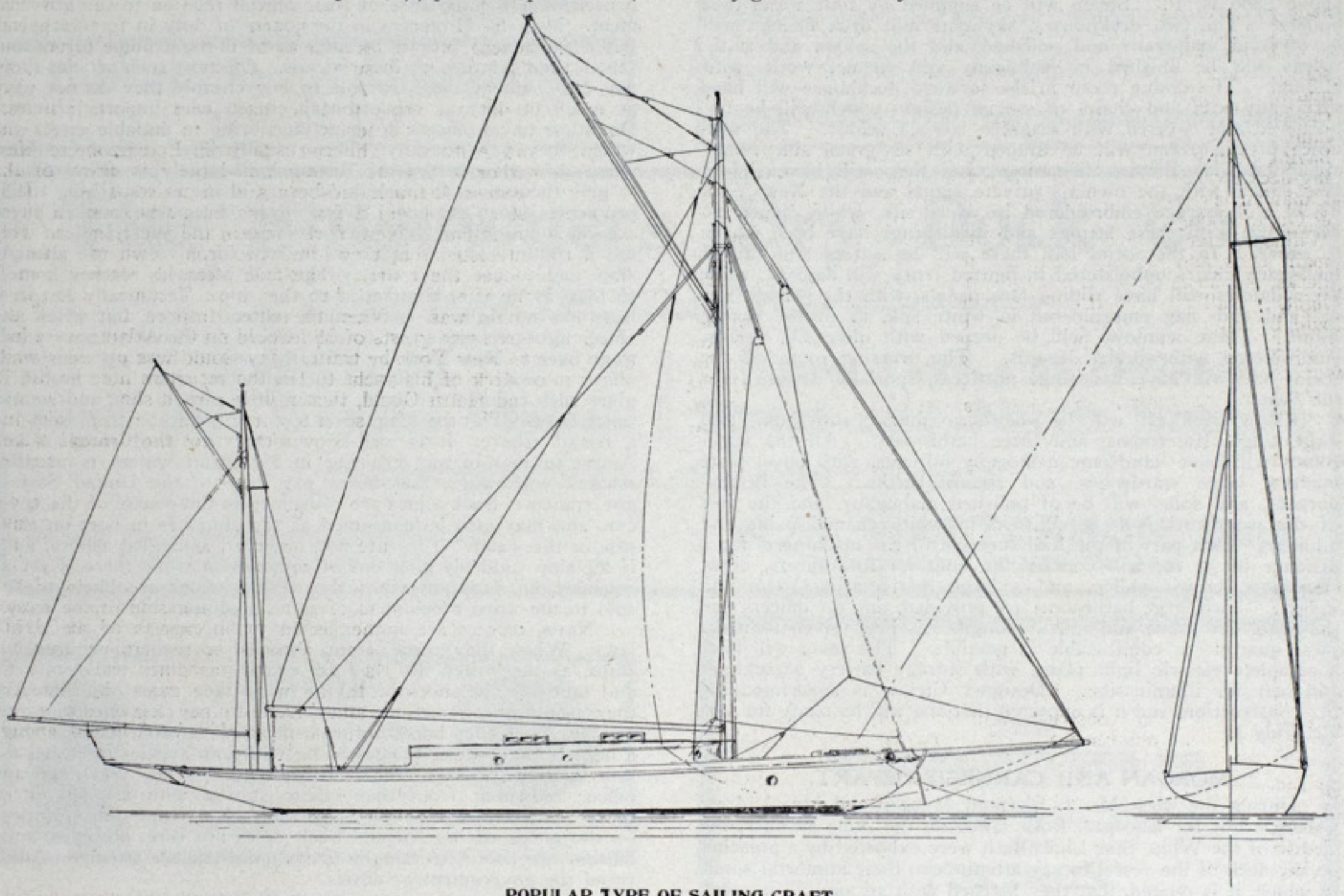
Not much concern is expressed by the naval constructors over the progress indicated in the reports of the Louisiana as compared with the Connecticut. The Louisiana is building at Newport News Ship Building & Dry Dock Co.'s works and the Connecticut at the New York navy yard. There is bound to be sharp rivalry between these two vessels, which are identical in design and which were started at the same time. Reports from Newport News show that the Louisiana was on April 1 about 6 per cent. completed. This is a more advanced percentage than that which obtains on the Connecticut. The naval constructors insist, however, that the Connecticut will be completed before the Louisiana. In the first place much of the material entering into the construction of the Connecticut is being assembled at Brooklyn and just as soon as the 40-ton crane is in operation the work on the Connecticut will be greatly facilitated. Then, too, the constructors say that the finishing touches on the ship contribute a great deal to the completion. At a private yard these are matters which cause much delay and annoyance since they require repeated consultation with the authorities. Rear Admiral Bowles expresses himself as satisfied that the navy department will make a good showing.

It is announced that the government may not advertise for bids for the construction of three training ships recently authorized but will build them instead at government yards. This is a tendency on the part of the government which should be combatted. The government yards are established for the repair of naval vessels and should be confined to this class of work. Whatever new construction is planned should be given to private concerns. It is only through private industry that a country grows great. The more work the government takes upon itself the less it gives its citizens to do.

GLASGOW SHIPPING LETTER.

Cunard Agreement and the big new Steamers—Technical Education of Engineer Apprentices—New Steamer for Canadian Lake Service.

Glasgow, April 20.—Lord Inverclyde, chairman of the Cunard company, speaking of the agreement between the government and the Cunard company says it is the most momentous transaction which has taken place in the history of the company. The essence of it is that during the term of the agreement the Cunard company is to remain a purely British undertaking—British as to its shareholders, British as to its ships, British as to its board and officials and employes, and British as to its management and control in every respect. The board has the entire support of the shareholders in regard to this distinguishing feature of the agreement. The Cunard company has undertaken to build two large steamers of high speed for the Atlantic trade, and these two ships and the rest of the fleet are to be held at the disposal of the government during the currency of the agreement. In return for this the government is to lend to the company the money for the construction of these two new ships at 2¾ per cent. per annum,



POPULAR TYPE OF SAILING CRAFT.

Auxiliary sail boat 57 ft. over all, 41 ft. on the waterline, 14 ft. beam, 7 ft. 1 in. deep and draws 4 ft. 6 in. of water—a type of craft very popular with yachtsmen who are fond of sailing. She makes a very commodious craft, having, besides the forecastle and galley, two large staterooms, toilet and bath, saloon and engine room. The motor is one of the gasoline type of 14 H. P. The Gas Engine & Power Co. and Charles L. Seabury & Co., Morris Heights, New York, are building several of them.

and also to pay the company, from the time these new ships begin to run, the sum of £150,000 per annum. All this, of course, was known, but Lord Inverclyde has reissued the draft with his official signature. He says it is intended to convene a meeting of the shareholders as soon as practicable for the purpose of obtaining their approval of such alteration in the articles of association as are required to enable the directors to enter into the formal agreement with the government, embodying the terms which have been arranged, but he regrets that it has not yet been possible to convene the meeting, because, although no time has been lost on either side since the negotiations with the government were concluded, it has not yet been found possible to have the formal agreement finally drafted and completed. Although the heads of the arrangement were completely settled months ago, many details in the drafting of the agreement have required the most careful consideration, both on the part of the government and the company. When the agreement came to be drafted and put into proper shape they had to deal with four government departments in the matter, namely, the treasury, the admiralty, the postoffice and the board of trade. Although it has taken a considerable time to get the matter put into proper shape, especially as a trust deed has also had to be drawn up providing for the security for the loan which is made by the government, there has been no unavoidable delay in working at the matter and everyone has done his best to bring things to a conclusion. The greater part of the negotiations have been conducted by the president of the board of trade, acting on behalf of the different departments involved, and he has conducted the negotiations with the most perfect spirit of fairness.

As to the new boats, Lord Inverclyde says: "We have not yet placed the contract for the two fast steamers which we have undertaken to build. These steamers will, of their kind, be the biggest thing which has yet been done in the world, and we have, therefore, desired to give the utmost care and consideration to every point before we definitely place the order with any one. It has not been time wasted. We have had the benefit of the advice of some of the best experts in the country in many matters pertaining to the ships. There is a vast amount of detail which requires to be thought out in connection with these steamers, especially as no shio builders were prepared, when we first went to them, to undertake straight away the building of such ships as we required. The best dimensions for the ships, their internal arrangements, the placing of their weights, their draught, their engine power, and many other details have required the greatest thought and care. I have the utmost confidence in what the result will be, and I am sure that time given now in thinking out these things is of the utmost value in the long run, and that we shall feel that we have left no stone unturned in endeavoring to design two perfect ships, which will, I trust, not only give satisfactory results to our shareholders but will be such ships as both the company and the country will be proud to own."

TECHNICAL EDUCATION OF ENGINEER APPRENTICES.

The subject of the technical education of engineer apprentices is to be introduced by Professor Cormack, late of Glasgow University, at the June meeting of the Institution of Civil Engineers. Some of the Clyde firms are adopting Mr. Yarrow's scheme, candidates who have obtained first-class certificates after a complete course of instruction over three years at a technical engineering college, or who have a first-class honors degree or its equivalent in an engineering course at a university, may be admitted as pupils. They will receive pay at the rate of 20 shillings weekly on entry, with an annual increase of 5 shillings per week. Candidates who have received a similar training, but have obtained lower class certificates may submit their names to the firm for admittance if they can be strongly recommended by the professors, but in any case these who have obtained the highest honors will have the preference. The time to be served is three years with the third year spent in the drawing office. Another scheme is intended for the sons of workmen and others who have not obtained university or technical college certificates and who are between the ages of sixteen and nineteen. They must be examined before entry by a competent examiner, chosen by the firm, in arithmetic and mensuration, algebra to quadratic equations, geometry up to the standard of the first four and the sixth book of Euclid, theory and use of logarithms, trigonometry to the solution of triangles, elementary theoretical mechanics, heat and electricity, freehand and mechanical drawing. The matriculation examination of an approved university or the school-leaving certificate of the University of London are to be accepted in so far as the subjects above have been covered. Any candi-

date who has a knowledge of mathematics or science above the standard indicated by the list will be at liberty to submit a statement of the additional subjects in which he might desire to be examined. The rate of pay will be 10 shillings a week on entry with an annual increase of 5 shillings a week. Every facility will be given to pupils entering under the second scheme for attending evening classes and it is required that at least two evenings a week shall be devoted to study. The time to be served will be four years, the fourth year, if the workshop record has been satisfactory, being spent in the drawing office. A third scheme is to suit those who believe that the best course of training for engineer pupils consists in spending the winter months at a university or technical college and the summer months on practical work in the shops. This system will be adopted for pupils entering under the conditions of the second scheme if a complete and satisfactory continuous course occupying six to seven months during the winter in each year can be arranged at an approved technical engineering college. Under this scheme work in the shops may be combined with a university or technical college course. The rate of pay while in the shops will begin at 10 shillings per week, rising gradually to 30 shillings per week.

STEAMER H. M. PELLATT FOR GREAT LAKES SERVICE.

Messrs. Russell & Co., Port Glasgow, have launched a steel screw steamer specially designed for the Canadian lake service, and built to the order of Messrs. William Petersen, Ltd., Newcastle-on-Tyne. This is the third vessel of a similar type launched for this firm within the last fortnight, the other two having been built on the Tyne. She is a smartly-designed awning-deck steamer, built to the highest class in Bureau Veritas for Canadian lake service, and is constructed for the Canadian Lake & Ocean Navigation Co. for service between Montreal and Fort William. Her dimensions are 250 ft. by 37 ft. by 16 ft. depth to main deck and 24 ft. to awning deck. She has lofty 'tween decks and large gangway doors, complete installation of electric light, and all other appliances suitable for her special trade. She will be engined by Messrs. David Rowan & Co., Glasgow, the cylinders being 21, 35 and 57 in. diameter with 36 in. stroke. There will be two large boilers of 180 lbs. working pressure for a speed of 11 knots loaded with full cargo. After the launch the H. M. Pellatt (as she is called) was towed to Glasgow, where her machinery will be put on board and the vessel otherwise completed for sea.

The turbine yacht Emerald, built by Messrs. Alex. Stephen & Sons for Sir Christopher Furness, has run her official trials on the Firth of Clyde. The trials consisted of four runs over the measured mile at Skelmorlie. Running against the tide the mile was done in 4 min. 6 sec., and running with the tide in 3 min. 50 sec., which gives an average of 15 knots per hour. All through the trials the almost entire absence of vibration was very noticeable, the vessel running with extreme smoothness. The yacht has been commissioned for six months by Mr. George Gould, the American millionaire, and she will be the first turbine propelled vessel to cross the Atlantic.

The statistical return of Lloyd's Register shows that the vessels in course of construction in the United Kingdom at the end of the first quarter were 425 of 974,680 tons, as compared with 431 of 1,240,344 tons at the corresponding date of last year. These figures do not include war ships or vessels under 100 tons but they exhibit the marked decrease in the demand for merchant craft all over the country. The proportion allotted by Lloyd's to the Clyde and Scotland generally is 307,857 tons, as compared with 442,869 tons last year.

REORGANIZATION OF THE CRAMPS.

It is probably undeniable that Cramp is the only American ship building name known in Europe. This firm of ship builders is historic. It is as much a part of American history as any enterprise could possibly be. Cramps is the cradle of the American navy. This noble institution is now to be taken over by a board of trustees under the general control of the Morgan interests. The Cramp authority becomes second to the Morgan authority by virtue of a loan of $7,500,000. If any one act proves the necessity of congressional aid to the shipping industry this one certainly does.

It is more than seventy years since William Cramp laid the foundation of the great ship yard. He had little capital but an abundance of energy. Wood, of course, was the common material for ship construction then. For forty years he worked steadily in the yard, believing that the best incentive to his workmen was an honest example. Charles Cramp, his son, worked under him and just as hard. He is working yet and will continue as president of the reorganized company.

When the Cramps put in a bid for their first Russian cruiser, the Variag, relates the New York Times, the czar sent for Mr. Cramp to come to St. Petersburg. The ship builder is anything but an imposing man in personal appearance. He is small and shy. When he was ushered into the imperial presence the room was filled with tall, imposing-looking Russians and Germans in uniform, many of them, as Mr. Cramp learned afterward, experts in naval construction, representing the various schools of Europe. Mr. Cramp had never seen an emperor before, so he sat down when the czar shook hands with him and then turned aside to some other caller for the moment, just as he had been accustomed to do when calling on business men in New York Philadelphia or Washington. He did not notice that everybody else in the room was standing. He was thinking about the sort of battleship he wanted to build for Russia, and how much it would cost. In a moment the czar came over and sat down by Mr. Cramp, thus relieving a somewhat embarrassing situation with much tact.

"And what school do you represent, Mr. Cramp?" he asked.

The American ship builder thought for a moment and replied. "The Cramp school. My father worked in our ship yard before me. I worked in the ship yard, every part of it, with him. What I know about building vessels my father and the hard school of experience has taught me."

The czar was pleased. "I want men of your stamp to build my warships," was his reply. In a few days Mr. Cramp got the contract. The Variag was such a success that he soon got a contract for a large and more expensive vessel, the Retvizan.

It was in 1872 that the William Cramp yard was incorporated under the name of William Cramp & Sons Ship & Engine Building Co., and the business of building warships began with the very largely increased facilities. John Roach, who was the owner of a ship yard on the Delaware river a few miles below the Cramps, had contributed the earliest vessels to our modern navy in the Atlanta, Boston and Chicago, and the Cramps went in to compete with him. About the same time that the Roach firm turned out the United States dispatch boat Dolphin, which was heralded in seagoing circles as a wonder, the Cramps turned out Jay Gould's $100,000 pleasure yacht Atlanta, far and away the most expensive yacht in American waters at that time. Jay Gould, without appearing to take very much personal interest in it, persuaded some friends to bring about a match between the Dolphin and Atlanta. The run was from Larchmont to New London harbor. Private betting was largely in favor of the Dolphin, because so much had been said in praise of her. It is said that Mr. Gould and a few of his intimates took all these bets they could find. New York brokers and yachting men were so much interested that they hired two iron steamers to follow the racers over the course. The iron steamers were not in it half an hour after the start, but they were almost as much in it as the Dolphin was. When the latter dropped anchor off the Pequot house some guests of Mr. Gould on the Atlanta were half way back to New York by train. Jay Gould was patiently waiting on the deck of his yacht to tell the reporters how he did it. His wife and Helen Gould, then a little girl in short skirts, was with him. "I never felt so happy in my life before," said Jay Gould. And he looked it. That victory got the Cramps talked about in great ship yards the world over, and orders began to pour in.

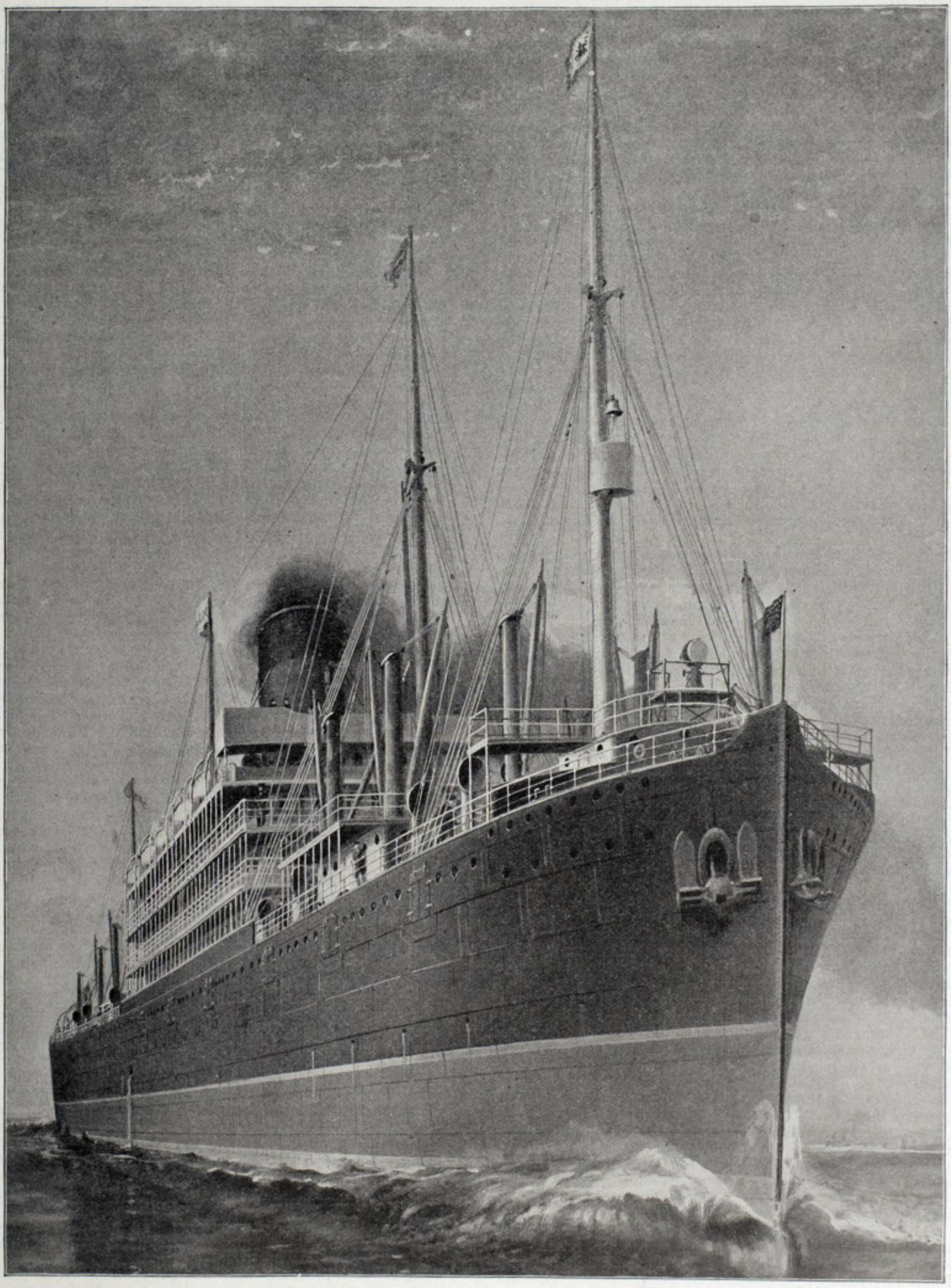
From that time until now the Cramps have been turning out the majority of Uncle Sam's battleships, armored cruisers and commerce destroyers. They have built the latest vessels of the American Line fleet, and rebuilt those originally constructed in British ship yards, notably the liner New York. The New York and the Brooklyn of the flagship class of armored cruisers came from Cramps. So did the Baltimore, immortalized at Manila bay, and the Philadelphia and Newark of the cruiser type, the dynamite cruiser Vesuvius that poured pneumatic shells into the Spanish at Santiago; later the Iowa, Indiana, Massachusetts, Alabama and the new Maine, and there are other new ones in course of construction. No other American ship yard is old enough yet to record such an achievement.

During the active career of William Cramp he built upward of 200 sea-going vessels in the yard he founded. One of his earliest triumphs was the George W. Clyde, an 1,800-ton vessel, built for the Santo Domingo trade. She carried on her maiden voyage the first compound steam engine built in the United States. The Morning Light, the Manitou and the Bridgewater, three of the fastest clipper ships of their period, were built by him. Later, in civil war times, came the New Ironsides and the Chattanooga. In the days of the packet fleet the Illinois of the old American Line. These were the most important vessels of their time sailing under the American flag. Shipping men to this day talk of the voyages of the Morning Light around Cape Horn. Every time she touched at New York and at San Francisco some story about her traveled clear across the continent. She was the best advertised boat of her day simply because something was always happening to her that the newspapers wanted to print. The Morning Light was the fastest and most weatherly sailer of her time. The Bridgewater and the Manitou were larger, but they had not the speed. The New Ironsides also was a remarkable vessel. No ship in the civil war navy, from 1861 to 1865, saw more active service. She was in the bombardment of Fort Sumter, the attack on Fort Fisher and many other important engagements. In 1866 she was burned to the water's edge while undergoing repairs at the League Island navy yard, Philadelphia. These were all triumphs of an earlier era, good of their kind, but long outgrown.

In its seventy odd years of growth, with a record of more than 300 vessels, the Cramp ship yard has spread from small beginnings to cover about thirty-two acres in the crowded part of a big city. With more capital, it will undoubtedly be made larger still, even to the extent of eclipsing some of the great yards in Germany and England, where room is abundant and working capital practically unlimited. The force of 100 men employed by William Cramp when he began business has been increased to 6,500 men on the payroll, with frequent calls for extra hands when there is a rush of work. Their total earnings are something like $75,000 a week. Expensive machinery has kept pace with the growth of business. The Cramps have one single implement now the cost of which exceeds the entire amount invested in Delaware ship building before William Cramp went into the business. It is a monster crane to lift heavy parts.

MARINE HOSPITAL SERVICE AT MANILA.

The branch of the marine hospital service located at Manila has, during the past year, been one of the hardest-worked quarantine stations in the world. During the year 1902, more vessels were held in quarantine, more passengers detained and more pieces of baggage were disinfected at the station at Mariveles than at all the quarantine stations in the United States combined. The quarantine service, then a separate organization, was transferred to the marine hospital service by executive order dated Jan. 4, 1900, and an officer of that service was detailed to serve as chief quarantine officer at the port of Manila and he arrived there from Hongkong on Jan. 12, 1900. The officer appointed to safeguard the health of the inhabitants of the Philippines was Dr. J. C. Perry, a physician who had been connected with the marine service for several years. Prior to taking station at Manila he had been at the port of Hongkong, where during the bubonic plague epidemic of 1899 he inspected every vessel and passenger that left Hongkong for American ports. To his vigilance and painstaking care were due the fact that the dread disease did not obtain a firmer foothold than it did in Pacific coast ports in the United States.



The Minnesota of the Great Northern Steamship Co.

From the Scientific American.] [*Building by Eastern Ship Building Co , New London, Conn.*

Previous to its transfer to the marine hospital service, the quarantine service had been conducted by the army. While incoming vessels to Manila had been inspected ever since American occupation of the islands, yet, owing to the insurrection and the pressing need of every officer for other duties, but little work was done, and the service was illy equipped for the treatment of infected vessels. Mariveles, the old Spanish quarantine station,

was, until the end of January, 1900, in the hands of the insurgents. About that date a company of United States troops occupied the place and established a post. A few days later the old Spanish site was inspected by Dr. Perry, and a report recommending the establishment of a United States quarantine station there was made, and work on the new station commenced at once. The same general quarantine laws and regulations in force in the United States are operative in the Philippine islands. All incoming vessels at ports of entry are inspected on arrival, between sunrise and sunset. No inspection is made at night except at the Mariveles station, as brilliant artificial light is necessary to a thorough inspection, and such illumination is lacking aboard all but a few of the vessels entering the port.

On arrival at Manila all incoming vessels at their anchorage near the city and those from infected ports are disinfected, and should any case of contagious or infectious disease be discovered the vessel is sent to the Mariveles station for detention and further disinfection. Vessels from infected ports, lists of which are supplied the various shipping agents by the quarantine office, are required to proceed to Mariveles before going to Manila, that assurance may be gained that they have complied with the necessary quarantine regulations. The stations at both Mariveles and Manila are extremely busy ones, this being especially true during the time when epidemic diseases are prevalent at island ports, as at such times it is necessary not only to inspect and disinfect incoming vessels, but also necessary to enforce outgoing quarantine regulations, as was done during the recent cholera epidemic. The work of the Manila quarantine service during the early months of this epidemic was successful in practically confining the cholera to the city of Manila and its immediate environs. The quarantine regulations were enforced in the strictest manner, and it is a noteworthy fact that during the entire period, when the disease was at its worst, but in a single instance, that of the United States transport Sherman, did a case of cholera appear during the voyage after having been cleared by the local quarantine officials. The quarantine at Mariveles is one of the best and most completely equipped in the orient. It is located on Mariveles bay, nearly opposite the island of Corregidor and the entrance to Manila bay, and is about 25 miles from Manila. It is on a government reservation of many acres in extent and is so situated that it gets the full benefit of the cool refreshing breezes from the China sea.

Work on the first buildings at the station was begun in May, 1900. These buildings consisted of a hospital and two barracks for the detention of steerage passengers. Soon after the date mentioned construction of the wharf was commenced. The equipment and construction of the buildings rapidly progressed toward completion, and the station was opened in the month of September, 1901. The station consists of a wharf 400 ft. long, 45 ft. wide and having a depth of 30 ft. of water at its face, enabling vessels of the deepest draught to come alongside. On the wharf is located a disinfecting shed, 150 ft. long, equipped with two steam disinfecting tanks 16 ft. long and 5 ft. 6 in. in diameter, and formaldehyde gas apparatus, enabling steam to be used for the disinfection of coarser fabrics and gas for those of a finer character, without injury to the article undergoing the treatment.

There are also two sulphur furnaces with the necessary pans and other apparatus for the disinfecting of ships' compartments, and two large boilers to furnish steam for the operating of the machinery, besides a large bichloride tank, designed to disinfect ships by a chemical solution. Back of the disinfecting shed is located the bath house for the steerage passengers, comprising undressing rooms, bath rooms and dressing rooms, and so arranged that no communication is possible between passengers who have taken a bath and those who are awaiting their turn. Each passenger, after having taken a bath, is provided with a suit of station clothes to wear while his are being disinfected. Adjacent to the stone pier, which extends from the reservation to the main wharf, is the bath house for the use of the cabin passengers. This is divided into sections for ladies and gentlemen, and the suites are all in threes—undressing room, bath room and dressing room. In this building are comfortable waiting rooms for ladies and gentlemen.

The foregoing comprise what is known as the wharf plant. On shore three barracks have been erected for the accommodation of steerage passengers, so arranged that each end of each building can be used for the segregation of one group of suspects or contacts so that six groups can be segregated at the same time. No communication is possible between these different groups on account of barbed-wire fences and doors intervening. Each building is equipped with the latest toilet appliances and plumbing, stationary wash stands, shower baths, etc.

The hospital is so arranged that the contagious or infectious diseases are kept entirely separate. The station has accommodations for the detention of 1,000 steerage passengers at one time, and is one of the largest in the east. A new building for the accommodation of cabin passengers has been erected recently. Its dimensions are 142 ft. in length by 43 ft. in width and it is two stories in height and contains forty-nine rooms in the main structure, giving accommodations for 100 cabin passengers at one time. The kitchen and dining rooms are separate from the main structure, being located in separate buildings to the rear.

Other buildings belonging to the station are the administration buildings, officers' quarters, attendants' quarters, laundry, store rooms and the electric light power house. A complete electric system has been installed and all the buildings are provided with electric lights, there being more than 500 incandescent lights installed in the various buildings besides three arc lights on the wharf and the same number on the station grounds. The water supply is ample, water being piped to the station from the mountains, a distance of about two and a half miles. To guard against fire, 1,000 ft. of 3½-in. hose is arranged about the buildings, and may, in case of fire, be attached to fire plugs, of which there are eight on the grounds and five on the station wharf.

The results of the work of the quarantine service was well shown during the course of the recent cholera epidemic. The first case of cholera in Manila was discovered on March 20, 1902, and is believed to have originated from the use of infected vegetables brought to Manila from China. The importation of fresh vegetables from Chinese ports was at once prohibited, and a rigid quarantine was immediately enforced on all vessels arriving from ports where cholera had been reported, and vessels leaving Manila for other Philippine ports were required to remain five days in quarantine, when, if no case of the disease had made its appearance on board, the vessel was allowed to proceed to its destination. These measures prevented for a considerable period of time the spreading of the epidemic from Manila and its immediate vicinity, and while the disease ultimately spread over a large portion of the Archipelago, the contagion was carried by small native boats sailing from other than ports of entry on Luzon. As an evidence of the efficiency of the quarantine service enforced during this period, it may be cited that out of more than fifty large ocean-going vessels, including many transports carrying in many cases more than 1,000 troops, in but one instance did a case of cholera make its appearance after the vessel had undergone detention and disinfection at the Mariveles station.

During the last fiscal year 382 vessels were disinfected at the Manila and Mariveles stations, an average of more than one a day. On some days as many as six vessels have been disinfected at the latter place alone. During the year, 5,433 vessels were inspected, and out of that number 807 vessels were held in quarantine for a period of five days or longer, 90,345 passengers were held in quarantine, 12,158 of them being suspects and contacts who were held a period of five or more days, while 29,976 persons were given baths at the station and had their clothes disinfected, 110,713 pieces of baggage were disinfected, and 3,058 bills of health were issued during the year. Besides the above 10,246 persons, native passengers and members of the crews of incoming vessels from ports where smallpox was prevalent, were vaccinated during the year.

During 1902 the quarantine stations at Iloilo and Cebu have been equipped with floating disinfecting plants for the treatment of infected vessels arriving at those ports. Each of these plants represents an expenditure of more than $200,000 gold, and it is intended that these southern stations shall act as centers, to where infected vessels in the island trade, and calling at southern and eastern ports, can be sent for disinfection. The quarantine regulations at Zamboanga, Jolo and Aparri, the other ports of entry, are the same as those that apply at Manila, but are enforced by army officers detailed for that service.

SUPPLEMENT TO IRON AND STEEL DIRECTORY.

One of the most valuable directories issued in the United States is the directory of the iron and steel works of the United States, published by James M. Swank, general manager of the American Iron & Steel Association, 261 South Fourth street, Philadelphia. Two editions of this directory have been issued recently, one under date of 1894 and the other 1901. Such, however, was the haste in getting out the 1901 directory to meet the demands of the trade for accurate information regarding the various consolidations that considerable valuable information was, of necessity, omitted. This has now been remedied by the publication of a supplemental directory. The supplement contains practically complete lists of the following leading consumers of iron and steel: Iron and steel bridge building works; iron and steel ship building plants; locomotive works; all kinds of car building works; car wheel works; car and locomotive axle works and steel locomotive tire works; chain works; cast iron pipe works; wrought iron and wrought steel pipe and tube works, riveted pipe works, and seamless-drawn tube works; wire works, wire nail works, cut nail works and horse nail works; works for the manufacture of cold-rolled, cold-drawn, turned, polished and ground shafting; stamping and metal ceiling works; malleable iron works; bolt, nut and rivet works; and works for the production of all kinds of heavy and light forgings, including drop forgings. The price of the supplement is $5.

Assistant Secretary of the Navy Darling has recommended to Secretary Moody that the contract for building the cruiser Galveston be forfeited and that the vessel be finished by the government. This is one of the incidents attending the misfortune of the Wm. R. Trigg Co. at Richmond, Va. Work upon the Galveston is far behind and the Triggs have gone into involuntary bankruptcy.

At present the model tank at the Washington navy yard is being utilized for a series of tests to determine the best type of scout ships for the navy. This action is in pursuance of a recommendation made by the board of naval construction, indorsed by Secretary Moody, that several comparatively light ships, to be known as scouts, be built for service for the different squadrons.

NEWS OF THE GREAT LAKES

LAKE FREIGHT MATTERS.

"Too many ships" is the answer on all hands when the matter of profit for vessel property in the present season of navigation is suggested. Still the vessel owners have reason to look with favor upon the first-of-May conditions now as compared with the situation at the same time a year ago, and 1902 was not by any means an unprofitable season. Most of the vessel men who have wanted season ore contracts on the 85-cent basis which represents about enough advance to care for increased operating charges, have gotten practically all the ore they care to take, and they are hoping that the Steel Corporation, having established the contract rates, will endeavor to keep the "wild" rates up to contract figures. Of course there are too many ships for the amount of ore business that can be cared for by the docks and railways, the situation in this regard being even more aggravated than it was last year. But as was the case last year, the ships will simply be used for storage at the docks, probably to a greater extent than ever before. It is also true that the new tonnage coming in this season is an important item, but this is fully offset, the vessel men claim, by the enormous supplies of coal that must be provided in the northwest, by more grain to be moved from Chicago than in 1902 and by the light freight movement in April this year compared with April a year ago. It is noted that of all the Gilchrist vessels—sixty-nine of them—only one will deliver a cargo in April, and that a load of coal that was in the vessel all winter. The demand for vessels for single trips since the opening has been about equal to the supply at 85 cents on ore from the head of Lake Superior, 75 cents from Marquette and 65 cents from Escanaba, with coal rates based on 40 cents to head of Lake Superior and 50 cents to Milwaukee. Coal contracts will probably be at rates the same as are being paid for single trips.

A VERY INTERESTING INSURANCE CASE.

The announcement from Buffalo, a few days ago, that United States District Judge Hazel had decided what is known as the Grand Traverse case in favor of the underwriters does not mean an end to the struggle between owners and underwriters on the Grand Traverse for a sum of money in excess of her insurance paid on account of her loss in collision nearly eight years ago through fault of the steamer Livingstone. The case will be appealed by the owners of the Grand Traverse. The question involved has been explained in these columns, but in view of its importance to vessel owners who often have their ships insured at policy values that are very much below market values it is again referred to.

The Grand Traverse was sunk in collision with the steamer Livingstone, Oct. 19, 1896, on Lake Erie. She became a total loss, was abandoned to the underwriters and total loss paid. The case growing out of the collision was tried before District Judge Cox and both vessels held at fault. The Grand Traverse interests appealed, and the United States circuit court of appeals held the Livingstone solely at fault. The value of the Grand Traverse was fixed at $37,500; her insurance valuation was $25,000. The underwriters on the Grand Traverse, when the cause was reversed and remanded, petitioned for the payment of the entire sum to them, claiming that by virtue of the abandonment and payment of total loss they were entitled to all the fruits of the recovery. The owners claimed that the right which the underwriter has in such cases arises in the equitable doctrine of subrogation, and is unaffected by abandonment; that the right of the underwriters in the fund recovered is limited to recoupment of the amount of their payment, in this case $25,000. They also contended that as their underwriters took no part in making the recovery of any risk in connection with it and did not contribute to the expense, but, on the contrary being underwriters on the Livingstone as well as the Grand Traverse had contributed toward the defense of the Livingstone; that while under the doctrine of subrogation they would ordinarily be entitled to repayment of the entire sum by them paid if the recovery from the wrongdoer equaled that sum and only chargeable with a pro rata of expense, in this case, by reason of their failure to aid in the recovery; their adverse interest as underwriters in the Livingstone, and their contributing toward the defense of the Livingstone, the expense of recovery should be deducted from their part of this recovery.

The question is interesting at this time, in view of the almost universal use of valued policies and of the growing practice of placing the insurance or policy valuation of the vessel at less than its market value. Under an open policy, in case of total loss, an owner is completely indemnified; under a valued policy, he may get the full indemnity provided by his contract and yet fall far short of being fully indemnified on his loss. Some policies contain stipulations as to the extent of the underwriters' interest in case of payment. The policies in this case are all, or substantially all, silent on this point.

NEW LAKE VESSELS.

A party of Cleveland investors, headed by a well-known vessel master, is figuring on a freight steamer which in all likelihood will be built by the Columbia Iron Works, St. Clair, Mich. Specifications have been prepared for a vessel 500 ft. over all, 480 ft. keel, 52 ft. beam and 30 ft. deep with a 6-ft. water bottom, triple-expansion engines and three Scotch boilers. Construction is to be on the 3-ft. frame space system which will make the hatches 9 ft. instead of 8 ft. She will have fifteen hatches, spaced 24-ft. centers.

The Craigs of Toledo have made plans for a steamer for the Adams Transportation Co. of the following dimensions: Length over all, 500 ft.; keel, 482 ft.; beam, 52 ft.; depth, 30 ft. She, too, will be built on the 3-ft. framing system.

It is reported that the Northern Michigan Transportation Co. of Chicago, which at present operates the steamer Illinois between Chicago and Charlevoix, is considering building another steamer for that route; and that the Indiana & Michigan Transportation Co. is also contemplating the construction of a steamer.

While the practice of assembling the machinery of a vessel in the machine shop and wheeling it to the dock and hoisting it by means of shear legs bodily on board the steamer is common at the Detroit yard of the American Ship Building Co. it has not been tried at Chicago until the present week, when the machinery of the steamer C. M. Warner, building for the United States Transportation Co. at the South Chicago yard of the ship building company, was thus installed by Supt. A. G. Smith. The machinery with all connections complete, was installed at once, and the operation of putting the engine together in the shop instead of on board saved about three weeks' time. At the Cleveland yard this installation is not practiced owing to the distance of the yard from the shop.

CANADIAN TERMINAL FOR FAST SHIPS.

Kingston, Ont., April 29.—The entry of the Canadian Pacific Ry. into the transatlantic shipping business and the prospect of the contract for the fast steamship line whenever it is awarded, being given to that company, raises the question of the port or ports that will be utilized as the Canadian terminal. Whatever may be the sentimental reasons for desiring to choose either Montreal or Quebec as the summer port for a line of steamers to Great Britain, there is absolutely no ground upon which either port can be regarded as being in the running when a really fast line is being considered. What is wanted, and what Canadians are slow to see, is a port on the Atlantic with an absolutely free entrance all the year round and with the shortest possible railway haul to the centers of population and distribution. All Nova Scotian ports are unfavorably situated in the latter respect and are more or less open to objection on account of ice or some other material obstacle. Even Halifax possesses some drawbacks along this line. In New Brunswick the St. John people look upon their harbor as being an ideal one and so it is in many respects. It gives at present the shortest railway haul to Quebec, Montreal and to Ontario points, but its facilities are cramped and a very large expenditure is required to make its harbor what it ought to be. For freight purposes St. John will be the principal winter harbor of Canada, but for the fast line, if it be provided, as is very likely, under Canadian Pacific Ry. auspices, an entirely new port will be selected. The port is St. Andrews in New Brunswick, a place at which the company has large interests and a port free from the force of the Bay of Fundy tide, which affects St. John, and giving a 40-mile shorter haul to Montreal than St. John, besides having railway connection with United States points. For sentimental reasons the Canadians want to have a line of steamers to Great Britain as fast as the fastest, but if for sentimental reasons they will prevent the selection of about the only suitable port on the Atlantic shore as the Canadian terminal, and insist on Montreal being the terminal port in summer, they must be prepared to put up the money for a line of 30-knot steamers on the ocean, seeing that 10 to 15-knot speed only can be calculated upon as being safe in the St. Lawrence gulf and river.

A record was made at Lorain this week in loading the new Steamer H. B. Hawgood with coal. She took on 6,500 tons at the car dumper in ten hours.

AROUND THE GREAT LAKES.

Capt. Thomas McGowan of Detroit has bought the schooner Marengo.

Repairs costing about $4,000 have just been completed on the wooden tow barge Biwabik at Marine City.

A. Green of Green Bay and Frederick Schwerman of Milwaukee have purchased the steamer George Burnham.

Geo. B. Crites, general foreman at Chicago for the Anchor Line, died at his home in that citv on Friday last of pneumonia.

Capt. John Stoner, an old lake master, died at Monroe, Mich., Tuesday afternoon. He had followed the lakes for fifty years.

During the present year the North Land of the Northern Steamship Co.'s fleet will run between Buffalo and Chicago and the North West between Buffalo and Duluth.

The steel tug Bonita, building for the Graham & Morton Transportation Co. of Chicago, was launched at Grand Haven on Friday last. She is 68 ft. long and 17 ft. beam.

Capt. Harris W. Baker of Detroit has sold the barge Colorado to the Charlevoix Lumber Co., which will use her for its own business. The terms of the transaction were not made public.

William S. Manuel has libeled the propeller T. H. Birckhead in the United States circuit court at Cleveland for contract for coal furnished amounting to $334.13 with interest from Aug. 10, 1902.

In backing away from dock No. 4 at Ashtabula last week the steamer J. J. Hill collided with one of the Brown hoists on the Angeline dock and smashed it. The damage will be repaired as rapidly as possible.

It is estimated that shipments of lumber from Two Harbors this season will not be less than 60,000,000 ft. The principal shippers are the Tower Lumber Co. and Swallow & Hopkins. The St. Croix Lumber Co. ships its lumber by rail entirely.

A new gasoline launch—quite a large one—building by the Viking Boat Co., Chicago, will shortly be turned over to Joseph Lenert of No. 157 E. Division street, Chicago, who will use her in the vessel supply business, of which he makes a specialty.

Work has been started by Hickler Bros. at Sault Ste. Marie, Mich., on their new marine railway. It will accommodate vessels up to 1,000 tons burden and will be completed by the middle of June. The design is by the H. I. Crandall & Son Co. of East Boston.

Capt. Ben Tripp, well known as a lake pilot, has been appointed to the position of traveling district manager for the large publishing house of the John C. Winston Co., Philadelphia. His district is northern Ohio and he will therefore be in lake towns and cities.

Royal Peck, chief engineer of the steamer Manitou, has been provisionally appointed inspector of marine boilers to succeed Stewart H. Moore at Chicago. The appointment will become permanent if Mr. Peck passes the civil service examination after sixty days' work.

In an effort to secure a share of the steamboat fuel business the Weaver Coal Co. at South Chicago has been furnishing the best of coal and making special efforts to accommodate the vessels. It is reported that they will also undertake fueling business in the Chicago river.

Indiana harbor, under development by Chicago capitalists, is to have a steamboat line. It is understood that the route will be opened by the steamer Ottawa, owned by Capt. E. C. Dunbar of Grand Haven. The terminals for the present will be South Chicago and Whiting, Ind.

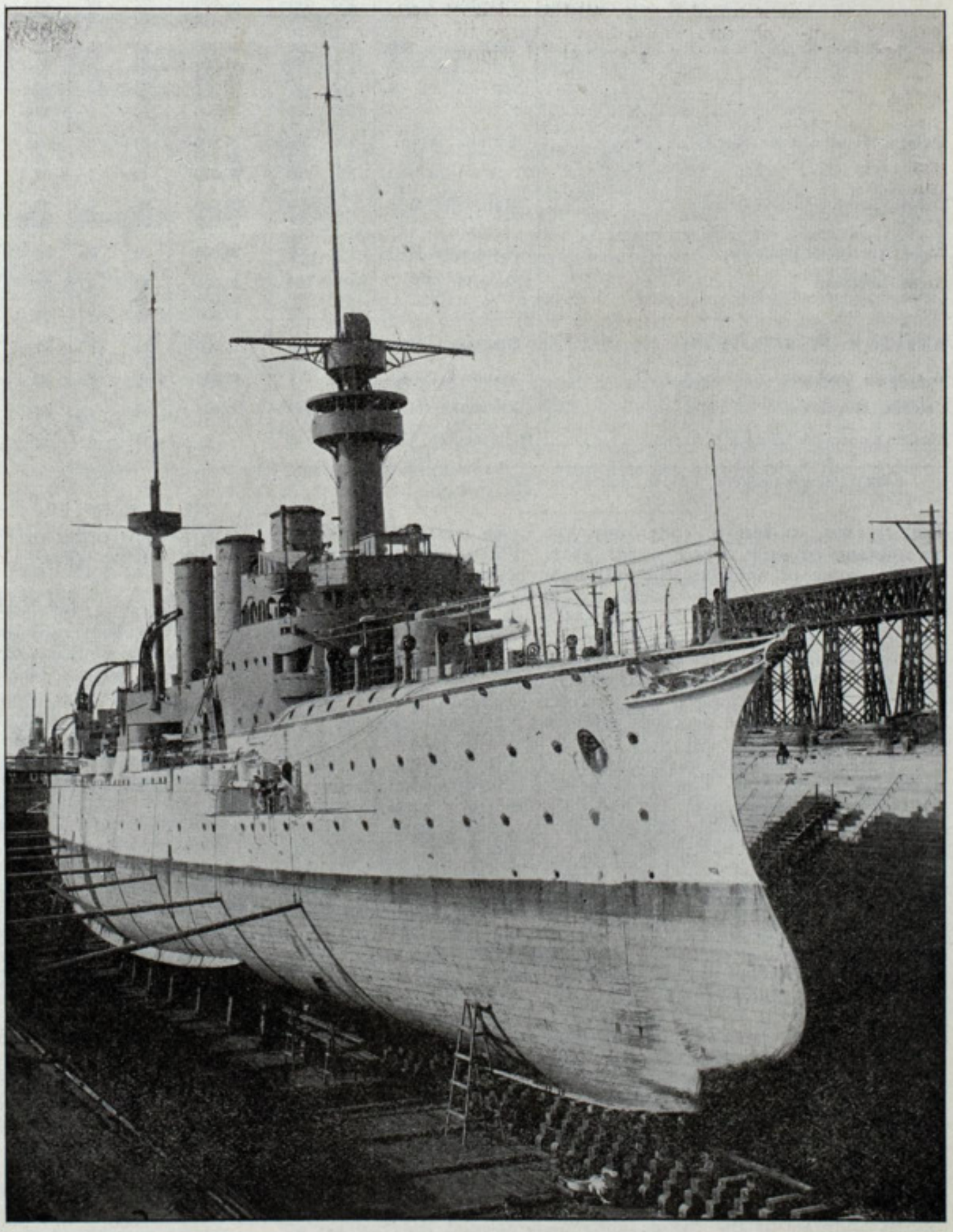
A Detroit dispatch says that the board of managers of the Lumber Carriers' Association will meet in that city on Tuesday, May 5, and very probably advance lumber rates to a basis of $3 per 1,000 ft. from the head of Lake Superior to Lake Erie ports. The owners of lumber vessels say that with increased operating expenses, increased loading and unloading charges, etc., there is no profit in the present freights.

Capt. A. B. Sinclair has sold the steamer J. C. Suit to M. Ryan, Capt. George Brooks and S. Smith of Duluth, who will operate her in the lumber trade. Messrs. Ryan and Smith are engineers who remained with the Great Lakes Towing Co. during the strike and who were shut out by the settlement. The men have evidently purchased the boat so as to have employment. Capt. Brooks was in one of the vessels of the Pittsburg Steamship Co. last season.

On Saturday last the steel steamer C. M. Warner, building for the United States Transportation Co. of Cleveland (Brown fleet), was launched at the South Chicago yard of the American Ship Building Co. She is 390 ft. over all, 370 ft. keel, 48 ft. beam and 28 ft. deep. Her engines are triple-expansion with cylinders of 20, 33½ and 55 in. diameter and stroke of 40 in. Steam will be supplied by two Scotch boilers 12 ft. 6 in. in diameter and 11 ft. 6 in. long.

For invention and ingenuity, Mr. W. F. Herman, general passenger agent of the Cleveland & Buffalo Transit Co., possesses talents that would win distinction in the trade of advertising expert. His latest is a little folder announcing the opening of the Cleveland-Buffalo service. The cover is of onion skin. In the center of the frontispiece page is a gold medal, inset upon which has been stamped with a die a picture of the City of Erie, justly called the flyer of the lakes. The schedule observed by the line is also stamped upon the medal. The effect is quite pleasing.

The Marquette & Bessemer Dock & Navigation Co., recently created and owned jointly by the Bessemer & Lake Erie and the Pere Marquette railroad, has taken over the shipping, docks and properties of the United States & Ontario Steam Navigation Co. An issue of $500,000 4½ per cent. thirty-year gold bonds, with a 1 per cent. sinking fund, principal and interest guaranteed jointly and severally by the Pere Marquette and the Bessemer & Lake Erie Railroad companies, has been authorized, of which $225,000 has been issued. One-half of the issue was purchased by the United States Steel Corporation, which owns the Bessemer & Lake Erie.



German Cruiser Vineta in Dry Dock at Newport News.

ADMIRALTY LITIGATION DECREASING.*

(By R. G MacDonald, attorney and proctor, Chicago.)

It may seem a little strange at first thought, but with the increase in tonnage on the great lakes has come a decrease in admiralty litigation. As a result of the commercial consolidations characterizing the two last decades of the nineteenth century there has been a decrease in litigation generally; but the decrease in the number of controversies in the admiralty courts antedates the period of commercial consolidations and is due very largely to a different set of causes. Prior to 1880 the admiralty lawyer had seen his practice decrease, so far as litigation is concerned, to only a fraction of its former proportions.

The situation at the port of Chicago may be taken as fairly representative of the situation at other points on the lakes. From 1880 to 1885 the number of admiralty cases instituted in the United States district court at Chicago averaged only about sixty per year. Small as was that volume of litigation, as compared with the tonnage entering and clearing the port, it has since then still further decreased, for during the six years from Jan. 1, 1897, to Jan. 1, 1903, only 333 cases were commenced, an average of only fifty-five per year. These 333 cases cover a wide range of subjects, the following being some of the different causes for which libels are filed: Collision, freight, demurrage, repairs, supplies, wages, towage, salvage, injuries to the person, death, breach of charter-party, to recover possession, to limit liability of owner to the value of the craft, on policies of insurance, on mortgages against proceeds of sale, for advances, for obstructing waterways, etc., etc. Of course a part of these suits were against the proceeds after the craft incurring the obligation had been disposed of at United States marshal's sale.

A number of causes have contributed to produce this decrease in marine litigation. The quite general substitution of steam for sail as a motive power has had its influence in that direction, as a steamer is less likely to come into a collision than a sailing vessel. Again the small craft of a few decades ago have been superseded by the 400 and 500-footers of today, and a large craft is scarcely more subject to a collision than a small one. Then in recent years the "collision clause" has been added to the policies of insurance, covering damage done as well as received by the insured boat. So that now it frequently makes little or no difference where the fault lies in case of collision, as the same underwriters carry the risks on both boats and must bear the loss in any event. Formerly the business was transacted by the masters who had upon their shoulders the duties and cares incident to navigation. Today it is done largely from offices on shore by men devoting their whole attention to those matters. It is no reflection on the master of the past to say that fewer disputes are to be expected under the present system. Then, too, the commercial consolidations of recent years have been as pronounced in marine affairs as in other lines of enterprise and have had their effect upon admiralty litigation, tending in the aggregate to diminish it.

In addition to the causes above enumerated the law on a number of questions has been settled by repeated court decisions, and those questions are litigated no more. Of course some new questions are arising, as, for example, those growing out of the opening of the drainage channel and the consequent reversing and increasing of the current of the Chicago river. But the new questions are probably more than counterbalanced by the practically settled ones.

But while the number of litigated causes is not as large as formerly, the average amount per case has probably increased. The decrease is in the volume rather than in the importance of the contested matters. And with the decrease in litigation has come a decrease in the number of lawyers equipped to undertake admiralty causes or advise in marine matters. There are 4,000 lawyers in Chicago, but practically all the admiralty business, office work as well as litigation, is attended to by about a half a dozen men. The remaining members of the bar are unfamiliar with the practice and procedure in the admiralty courts and probably do not know a port tack from a starboard list.

The tendency to litigate less is only a natural manifestation of the new order of things under which business is being transacted on the lakes.

* From 1903 Ship Masters' Directory.

PARTICULARS OF ORE SHIPPING DOCKS OF THE GREAT LAKES.

Corrected to May 1, 1903.

(Compiled by Mr. R. Angst, chief engineer Duluth & Iron Range Railway)

RAILWAY.	LOCATION.	Dock No.	Number of pockets.	Storage capacity, gross tons.	Height water to center of hinge hole		Height, Water to deck of dock		Width of dock outside to outside of part'n posts.		Length of spouts.		Length of dock.	Angle of pockets.	
					ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	deg.	min.
Chicago & North Western	Escanaba, Mich.	1	184	24,104	28	10	48	6	37	0	21	0	1,104	39	30
" " "	" "	6	320	58,000	40	0	70	0	50	2	30	0	1,920	45	0
" " "	" "	3	226	30,284	31	2	52	8	37	0	27	0	1,356	45	0
" " "	" "	4	250	32,750	36	6	59	2	37	0	30	0	1 500	45	0
" " "	" "	5	232	43,152	28	6	53	3	37	0	21	8	1,392	40	0
" " "	Ashland, Wis.	1	234	36,036	32	10	54	0	46	8	27	0	1,404	39	30
" " "	" "	2	234	25,740	36	6	57	8	46	0	27	0	1,404	42	0
Duluth & Iron Range	Two Harbors, Min.	1	202	40,400	35	5	59	6	49	0	27	0	*1,388	38	42
" " "	" " "	2	208	41,600	33	5	57	6	49	0	27	0	1,280	38	42
" " "	" " "	3	90	16,200	28	10	52	0	49	0	25	0	572	38	42
" " "	" " "	4	168	36,960	37	0	62	0	49	0	29	0	1,112	38	42
" " "	" " "	5	168	33,600	30	0	54	6	49	0	25	0	1,112	38	42
Duluth, Missabe & Northern	Duluth, Minn.	1	384	57.600	30	0	53	0	49	0	27	9	2,336	45	0
" " "	" "	2	384	69,120	32	0	57	6	49	0	27	9	2,336	45	0
" " "	" "	3	192	40,320	40	7	67	½	59	0	27	9	1,152	45	0
Duluth, South Shore & Atlantic	Marquette, Mich.	1	270	27,000	25	0	45	0	40	0	20	4	1,700	39	0
" " " "	" "	4	200	28,000	27	9	47	3	36	8	21	1	1,200	39	45
Lake Superior & Ishpeming	Marquette. Mich.	1	200	36,000	30	9	54	0	50	0	24	7	1,232	38	40
Great Northern	Superior, Wis.	1	250	40,500	32	0	57	0	49	8	27	2	1,525	45	0
" "	" "	2	350	87.500	40	0	73	0	62	8	32	4	2,100	45	0
" "	" "	3	160	40,000	40	0	73	0	62	8	32	4	960	45	0
Minn , St. Paul & St. Ste. Marie	Gladstone, Mich.	1	120	15,000	26	8	47	0	37	0	21	8	768	40	0
Wisconsin Central	Ashland, Wis.	1	314	48,356	40	0	66	2	36	0	27	0	1,908	50	45
Chicago, Milwaukee & St. Paul.	Escanaba, Mich.	1	240	50,400	40	2¾	66	6	52	0	29	0	1,500	45	0
Algoma Central & Hudson Bay.	Michipicoten, Ont.	1	12	.....	34	0	43	4	25	0	22	6	311¼	44	0

* 312 ft., single pockets; 1,076 ft., double pockets.

CANADIAN SHIPPING NOTES

The Montreal school of navigation, which was inaugurated in January of this year, has just been inspected by Capt. Salmon, R. N. R., of the department of marine, Ottawa, who states that it is doing a good work. Thirty students are in attendance. A movement is on foot to provide a training ship for the school, on similar lines to the Conway in Liverpool, Eng.

The third steamer built for the Canadian Lakes & Ocean Navigation Co. has been launched at the works of Russell & Co., Glasgow, Scotland. She is named H. M. Pellatt and is a sister ship to the A. E. Ames and J. H. Plummer, launched on the Tyne, March 30.

At Parrsboro, Nova Scotia, there are at present under construction two three-masted schooners, one steamer and a coal barge of 1,100 tons, and at Port Greville, adjoining, there are being built one two-masted and three three-masted schooners, all of wood.

The Toronto Ferry Co. has chartered its steamer Mazeppa to Marks & Wiley of Port Arthur who will use the vessel as a ferry.

A coal dock and coal handling plant of 350,000 tons storage capacity has just been completed at Fort William and vessels are accordingly assured of better dispatch at that port.

A tug named Hector has been launched at Port Colborne for Hogan & MacDonnell for Welland canal service.

The wreck of the barge Sagamore, sunk off Iroquois point several years ago in collision with the steamer Northern Queen, has been located, and Zess & Derocher of Sault Ste. Marie are taking everything of value off the wreck which lies in 75 ft. of water, all stove in and not worth trying to save.

SOME DETAILS OF LAKE SUPERIOR COMMERCE.

In the United States engineer office at Duluth the law relating to the compilation of commercial statistics at all points where the government is spending money for the improvement of rivers and harbors seems to be carefully lived up to. This is not true of other points on the lakes, although it must be admitted that the engineers are decidedly at a disadvantage because of the worthlessness of such statistics as may be secured through the collectors of customs. The Duluth office evidently gets most of its information directly from the vessels, spending time and effort in doing so, of course, just as is done at the Sault canal. The following valuable statement regarding commerce of Lake Superior harbors has just been given out by Capt. D. D. Gaillard, United States engineer at Duluth:

STATEMENT OF LAKE COMMERCE AT THE VARIOUS HARBORS ON LAKE SUPERIOR, DULUTH, MINN., DISTRICT, FOR THE CALENDAR YEAR 1902, WITH VALUATION; ALSO FOR THE PERIOD SINCE WORK WAS COMMENCED BY THE UNITED STATES, WITH TOTAL VALUATION.

NAME OF WORK.	Vessel freight, 1902.		Date of commencement of improvement by the United States.	Vessel freight from commencement of work to Jan. 1, 1903.	
	Tons of 2000 lbs.	Estimated value.		Tons of 2000 lbs.	Estimated value.
Grand Marais	24,233	$ 338,975	1880	79,892	$ 3,065,839
Agate Bay	6,563,456	15,789,960	1887	39,092,759	79,145,978
Duluth-Superior	*a* 17,505,793	194,444,695	1867	120,964,166	1,809,102,514
Port Wing	40,723	653,400		72,150	958,400
Ashland	*b* 4,625,450	16,701,927	1887	47,618,562	403,659,566
Ontonagon	*c* 5,735	463,309	1867	2,710,864	71,365,654
Waterway across Keweenaw	*d e* 2,532,323	65,326,819	1891	*e* 13,934,920	448,290,719
Operating and care of same			1891		
Marquette	3,110,709	7,882,883	1867	25,490,776	121,021,300
Harbor of Refuge, Marquette	1,762,886	4,210,231	1897	8,854,616	21,625.871
Harbor of Refuge, Grand Marais	125,125	2,077,838	1880	992,299	12,290,767
Totals	36,206,433	$307,890,037		259,811,004	$2,970,526,608

NOTES: *a*—Does not include 136,600,000 ft. of logs; *b*—202,350,000 ft.; *c*—3,750,000 ft.; *d*—31,140,000 ft., a total of 373,840,000 ft.; *e*—largely freight passing through canals.
All tons are of 2000 lbs.

CO-OPERATION WITH THE WEATHER BUREAU.*

(By Willis L. Moore, chief United States weather bureau.)

The storm warning service of the weather bureau on the great lakes is maintained solely in the interest of the lake marine, and it can be of use and value only to the extent to which ship masters and ship owners utilize its forecasts and warnings. The weather bureau employs every means at its disposal to convey to ship masters information regarding approaching storms, and its daily forecasts of wind force and direction and weather and the special storm warnings are given the widest possible distribution, and prominent display, at upward of one hundred storm warning display stations on the lakes. In addition to the distribution that is thus made at regularly established stations, the daily press in all of the important cities and towns of the lake region gives prominent place to the weather forecasts, and there is not a telephone subscriber in all of the vast region that is bounded by New York on the east and Minnesota and Wisconsin on the west that cannot at any hour of the day or night call upon our observers for the latest weather information. This has been rendered possible by the placing of telephones, not only in our offices, but also in the residences of our observers. And further, when ship masters, owners, or agents are unable to reach our observers by telephone, they can telegraph, at government expense, to the weather bureau offices at Chicago or Buffalo for the information they desire.

The facilities thus afforded by the weather bureau for furnishing information to the ship master lead up to the point where, in order to profit by the information, the ship master must perform his share of the co-operative work, and I am free to admit that, in my experience, the ship masters of the great lakes are recognizing more and more the business necessity of taking advantage of the weather knowledge at their disposal, not only as it relates to storms, but also as it applies to the ordinary winds and weather that may, even in a slight degree, aid or impede their daily runs; for economy of time, fuel, and the supplies that are consumed in the daily runs of modern steamers are important items in the business economy of individual and corporate vessel owners.

Bearing these facts in mind, and with the consciousness that can be readily acquired by trial, that all observers of the weather bureau stand ready and willing to serve the masters and owners of vessels, and also the shippers and travelers that entrust their property, and at times their lives, to lake vessels, it is the hope and belief of the chief of the weather bureau that masters of vessels will in the future recognize to an extent greater than ever before that our most important duty is to serve them, and through them the vast commercial interests of our great lakes.

*From 1903 Ship Masters' Directory.

SOAP AND THE FORECASTLE.

Editor Marine Review:—To determine the degree of civilization reached by a nation, an observant individual once said one needed only to inquire into its percapita soap consumption, and the country whose inhabitants used the greatest amount of soap stood upon the highest plane. Certain it is that the individual who enjoys cleanliness of body will attempt to cleanse, and next to embellish his surroundings. It is for this reason, no doubt, that the inhabitants of the largest soap consuming countries have the most tasteful, the most luxuriously appointed homes, and that each increase in the demand for soap—which is equivalent to an advance in civilization—shall speedily be followed by the erection of better houses.

Incidentally it may be well to say here, first, that this is not a puff for a certain brand of soap, and, second, that those who are anxious to determine the degree of civilization attained by their country, and who are unable to get soap statistics, can draw their own conclusions after a careful inspection and an unprejudiced comparison of homes.

Only a short while ago there came into New York a steamer—the largest one in the world—the most luxuriously appointed floating palace that ever attempted to give passengers home surroundings. Deservedly proud of their expensive investment, the owners gave orders to admit the public on board, and with uniformed quartermasters to act as guides, the decks were thronged with an admiring crowd, while the daily press was lavishly praising the step civilization proved to have advanced by the demand for a $4,000,000 western ocean home. "And here are the quarters for the crew; this is a forecastle."

There are, we all know, beautiful palaces on New York's Fifth avenue, and within a stone's throw one can see wretched tenements. But, while the captains of industry live surrounded by greater splendor than the wealthy men of olden times, so the poor, even in their tenements, have kept pace with advancing civilization and now dwell under better roofs and inhabit superior homes than did their prototypes in the days of yore. Ashore, the rich and the poor, the strong and the weak, the high and the low, have all—judging by their homes—advanced in civilization.

And now to return on board this magnificent steamer. No dictionary could furnish words or phrases to adequately describe the splendor of the cabins and the success of the builders' attempt to give the passengers a suggestion of a twentieth century home. Passengers and officers are housed in accordance with their right as soap-consumers par excellence. And the crew? The men that pull the ropes and shovel the coal. With the exception of the forecastles being larger to accommodate a larger number of men, no attempt has been made to improve on the appearance of the forecastles as found on former steamers. The march of civilization causes a renovation in the tenements ashore but seems unable to effect a change in the slums of a floating city, and the forecastles of the so-called ocean greyhounds are as bare, as unattractive and as little suggestive of a home on the ocean wave as those that give shelter to the crew of a twenty-year-old collier.

By furnishing sailors and firemen with free reading rooms, free concerts, free entertainments, and free legal advice in every large port, they have been aided to keep step with the march of progress, but when afloat, though their superiors' quarters are yearly improving, they are forced to be content with the accommodations of another age. FRANK HANSON.

After some years of inactivity in construction, the Boston navy yard is now at work on a tug to be named Pentucket. Owing to lack of facilities at the yard the stern post and rudder are being forged at the Norfolk navy yard and the shop forgings for the crank shaft, the line and propeller shafts were made at the Fore River ship yard at Quincy, Mass. The Pentucket is built of steel throughout and will be a sea-going two-masted tug of 225 tons displacement. Her dimensions will be: Length, 102 ft. 6 in.; beam, 21 ft. 1 in.; depth, 8 ft. 9 in. When finished she will take the place of the tug Iwara.

Heath's ship yard, Tacoma, Wash., is building a steamer to be named Clallam for the Puget Sound Navigation Co. of Seattle. When ready for service the steamer will be operated between Seattle, Tacoma and Victoria. She is 168 ft. long, 32 ft. beam and 13 ft. molded depth. She will be equipped with a fore-and-aft compound engine capable of developing 800 H. P. The steamer will have a full upper cabin with forty-four staterooms.

A steel tug, the Fireproofer, intended for service in New York harbor, was successfully launched from the Spedden ship yard, Baltimore, recently. The Fireproofer is 110 ft. over all, 101½ ft. between perpendiculars, 21 ft. 3 in. beam and 12 ft. depth of hold. Her compound engines are to have cylinders measuring 15 and 30 in. diameter with piston stroke of 22 in. Steam will be supplied by a Scotch boiler of 11 by 11 ft.

The tugboat Roselle, built by the Neafie & Levy Ship & Engine Building Co., Philadelphia, Pa., for the Central Railroad of New Jersey for harbor services in New York, is 98 ft. long, 24½ ft. beam and 13.8 ft. deep. She is fitted with a compound engine that has cylinders of 18½ and 40 in. diameter with 28 in. stroke and a return tubular boiler of 14 ft. diameter and 12 ft. length.

HEATING AND VENTILATING LARGE SHOPS.

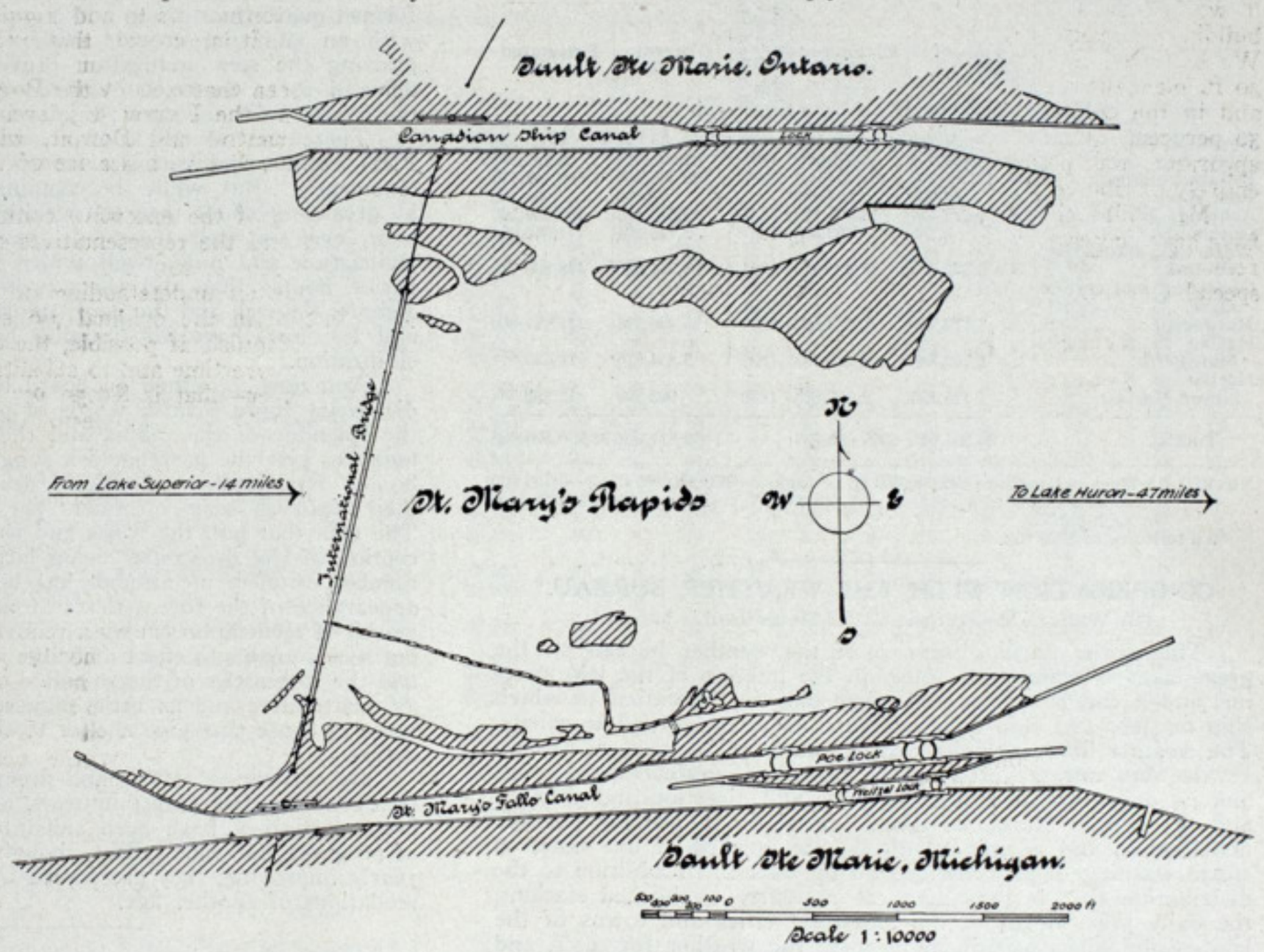
At the works of the New York Ship Building Co., Camden, N. J., and the Fore River Ship & Engine Co., Quincy, Mass., are some of the largest shops in the country—immense one-story buildings. Methods adopted for heating and ventilating these new structures were therefore a subject of considerable interest to members of the New York Railway Club who met recently to discuss the matter of heating the different kinds of large buildings that come under their direction.

While such buildings are very simple in construction, they are not so simple as might appear in regard to the problem of effectively distributing heat and air. On account of the large amount of roof, wall and window surface, the loss of heat is very great, and also, because of this and the relatively great height of the building considered as a single room, there is a tendency towards unequal distribution of the heat, the warm air rising to the roof and the cold air flowing to the floor, where it renders the workmen uncomfortable. It is important, then, not only that a sufficient quantity of heat should be delivered to the building, but also that it should be delivered where it will do the most good. If an attempt is made to supply the heat directly by means of steam or hot-water coils the best results are not obtained. The vicinity of the coils is apt to be uncomfortably hot from the heat radiated directly therefrom, while places at a distance are disagreeably cold. The heat transmitted to the air of the room by contact and convection from the coils is largely lost, since the hot air rises vertically and imparts its warmth to the roof and skylights. It is also to be objected to this system of heating that it makes no provision whatever for ventilation, the extended system of steam or water pipes is subject to damage by freezing during the coldest weather and steam pipes have been shown to be frequently the cause of fire where they came in direct contact with wood or other inflammable materials.

Due principally to the reasons which have been given, the direct system of heating for work of this character is falling into disfavor and is being superseded by the fan or hot-blast system. The apparatus required for the latter consists usually of a steam coil for heating the air, an engine or motor-driven fan for propelling the air through the heater and to its destination in the shop, and a system of piping or ducts leading it where it is needed. The heater will contain a considerable less length of pipe than would be required for direct heating, due to the higher velocity of the air over the pipe surfaces. The blower is additional equipment, but its use would be justified on the score of ventilation alone, something which is hardly considered at all in the direct system of heating. The exhaust of the engine is usually turned into the heater, thus obviating any loss from that source. The distribution of the air by means of pipes should be so carried out that the lower part of the room is kept at a comfortable temperature, while at the same time no disagreeable drafts are produced. It has been found that by properly proportioning and directing the delivery flues most satisfactory results can be secured. Illustrating this point some very interesting examples were cited, at the meeting mentioned above, by Mr. C. H. Gifford of the B. F. Sturtevant Co. He said:

"In the first place, if you desire air or almost any other form of gas or substance at any particular place at any particular time, the best way is to provide a suitable conduit to deliver it there, and I would add, if there is any difficulty, which there may be, by air blowing on an individual workman, it is a simple mechanical detail to rectify it, and, if you are unable to predetermine where the men or machines are to be located in a building, you can simply have an adjustable discharge opening from the pipe delivering the air, and if, perchance, it blows upon someone there generally is some space near the person to which the air can be directed and therefore cause no inconvenience whatever.

"As an example of what can be accomplished by distribution, I have in mind a machine shop, that of the New York Ship Building Co. They have a building which I believe is about 1,100 ft. long, about 250 ft. wide and 82 ft. high. The proposition was to heat one-half of this building and leave the balance of it unheated. It was a problem that came to me, and I must say that I was a little phased at attempting to heat one end and not have any interference from the other end. We however conceived the idea that there could be a partition put across the middle of the building about 12 ft. high, and we could then bring the heated air down to the zone which it was desired to heat, which was not over 8 ft. above the floor, and in that way we could perhaps confine the air in the space, and not have very much effect on the rest of the building. It was something of a speculation and rather a bold attempt, when you consider entering into a guarantee which might involve a serious loss; nevertheless it was done. The apparatus is arranged under the landing platforms of the gallery which surrounds the shop, so that it is out of the way of the cranes. Pipes are carried along beneath the runway of the cranes and branches are brought down on the posts and discharge the air towards the floor, the outlet being in the form of a Y, which is adjustable. We were very much gratified after the plant was started to find that it performed just as was expected it would, and it is surprising to note the difference in temperature between the two sides of that partition. It is almost the same as when you pass from the building out of doors. The result is simply due to the fact that the air was brought down and continually pressed down into the space which it was desired to heat."



A view of Canals, Locks and Rapids in the St. Mary's River.

Further emphasizing the advantages of correct distribution Mr. Gifford says that it is "possible in some cases to introduce $50 worth of additional pipe to carry the air where it is most needed, so that you can, on account of this, leave out $100 worth of heating apparatus. That is, you can get equal results by using smaller apparatus and less steam." The adoption of the fan system renders the control of the heating apparatus and of the ventilation ideal. During very cold weather, or in the morning when the building is being heated up, the air supply may be drawn from within the building itself, thus effecting a great economy of heat. In some buildings having a very high cubic space per occupant, sufficient ventilation during the winter time will be supplied by the leakage of air through doors and crevices about the windows, by transfusion, etc.

Quoting Mr E. T. Child, also of the Sturtevant Co., some of these advantages are as follows: "First, a great convenience in handling, since the entire heating system of a building may be controlled from one point; second, efficiency and economy, by controlling the speed of the fan and reducing the length of pipe to which steam is supplied, leaving more steam available for other purposes; third, the fact that the entire heater coil is in a steel housing makes the danger from fire much less than with many pipes passing through partitions of wood; fourth, in the summer time it gives the opportunity to ventilate the shops, and this, I think, is quite important. Some shops are very apt to become over-heated in the summer time and a current of cold air may be drawn from a basement making them much more habitable.

"The pipes should be so arranged," says Mr. Child, "that the air will not be discharged directly upon the workmen. It is

also true that hot air will do the most good if it is put where it is needed. If the space around the walls of a building is properly heated, one may never worry about the center, as that will keep warm. We have found, therefore, the most satisfactory heating will result from numerous pipes discharging on the outside walls at a point about 6 ft. to 8 ft. above, and directed towards the floor. These pipes should be located from 25 ft. to 40 ft. apart, depending upon the character of the building. This arrangement causes hot air to be blown downward, whence it spreads on the floor, keeping it warm before the air has a chance to follow its natural tendency and ascend to the roof. Hot air has a very bad faculty of getting up in the trusses and if you blow the air directly at the floor and get the floor warm, at the same time keeping the outside of the building warm, your problem is practically solved. In the case of an underground duct, it is well to use short outlet pieces which will discharge the air along the walls at the floor.

"At the works of the Fore River Ship & Engine Building Co. they have an overhead pipe system with drops on the walls, which was put in according to the regular practice. Later they added 50 per cent. to the building and are now heating it with the same apparatus. That is, we picked out a fan heater which we considered to be the proper size for that particular building and it worked in a perfectly satisfactory manner. Later the ship building company added 50 per cent. to the length of the building. We extended the piping and carried drops on the walls every 30 ft. blew the air on the floor with ample outlets on the ends, and in the coldest weather the heat of the building, which is 50 per cent. larger than we would care to guarantee with our apparatus, was perfectly satisfactory to them. Their success is entirely attributed to the excellent system of air distribution."

Mr. Child cited numerous instances of railway shops that have been successfully heated and ventilated along the lines above referred to. He classified the railway shops and explained the special treatment required for the different classes.

PROGRESS OF WORK AT FORE RIVER.

Quincy, Mass., April 28.—Considerable progress has been made during the past week on the United States cruiser Des Moines at the Fore River Ship & Engine Co.'s yard. The work of completing the fittings is employing a large crew of men, and the progress on the engines has been so rapid that it is expected to have a dock trial in a few weeks—as soon as the funnels can be placed and a few missing pipes and connections placed.

Two shipments of steel shapes, including I-beams, angles, channels, angle-bulbs and T-bulbs, have been received from the Steel Company of Scotland, and now the work on the six-masted schooner William L. Douglas will be rushed to completion. About 360 tons of steel have been put into the frame, the bottom of which is nearly completed. The two ballast tanks have also been built.

In October of last year the United States government awarded the Fore River company a contract for sixty sets of forgings for 3-in., 50-caliber, rapid-fire guns, to be delivered at the rate of four a month. The work is now ahead of the contract, and the monthly delivery is usually about double the required number.

Work on the United States battleship New Jersey is being pushed day and night. The structural work of the hull is 32 per cent. completed and gaining at the rate of 1 per cent. a week. From 50,000 to 100,000 lbs. of steel are added daily, and now the gun deck is nearly completed and the main deck beams are being placed. Another section has been added on both the stem and the stern post. All the bulkheads in the lower part of the hull are in place and theside plates are going on daily.

Steel is being incorporated in the hull of the United States battleship Rhode Island at the rate of 50,000 lbs. a day, and the structural work of the hull is estimated to have advanced 4 per cent. during the month of March, the degree of completion being 31.5 per cent. The gun deck is being laid and preparations are being made for installing the foundations of the forward turret barbette. Another section has been added to the stern post and the frames and bulkheads are all in place in the lower part of the hull.

OFFICERS OF LAKE VESSELS.

Rutland Transit Co., Ogdensburg, N. Y.: Steamers.—J. R. Langdon, Capt: H. Brown, Engineer D. G. Costello; H. R. James, Capt. James Owen, Engineer James Turnbull; A. McVittie, Capt. T. Bough, Engineer A. J. Kinch; Gov. Smith, Capt. W. S. Shay, Engineer L. O. Willix; F. H. Prince, Capt. E. B. Shay, Engineer John Alexander; W. A. Haskell, Capt. W. H. Plumb, Engineer John Phillips; W. J. Averell, Capt. Jno. Smith, Engineer Wm. J. Brown: W. L. Frost, Capt. John Gallagher, Engineer Geo. Adams.

Helm, Arthur C., Mgr., Estate of W. M. Egan, Chicago: Steamers.—P. D. Armour, Capt. F. D. Chamberlain, Engineer F. Keating; John Plankington, Capt. L. H. Powell, Engineer J. Rossau; Wiley M. Egan, Capt. Fred Howe, Engineer C. H. Diem; R. P. Fitzgerald, Capt. Leslie E. Bryce, Engineer F. Coleman.

Structural weakness has developed in the five gunboats which Japanese companies built for the United States navy for service in the Philippines and the navy department has ordered them rebuilt.

MISCELLANEOUS SUBJECTS.

George H. Hitchings, Hoquaim, Wash., has just completed a wooden schooner named fearless for the E. K. Wood Lumber Co. of San Francisco. She is 182½ ft. long, 38½ ft. beam and 14½ ft. deep.

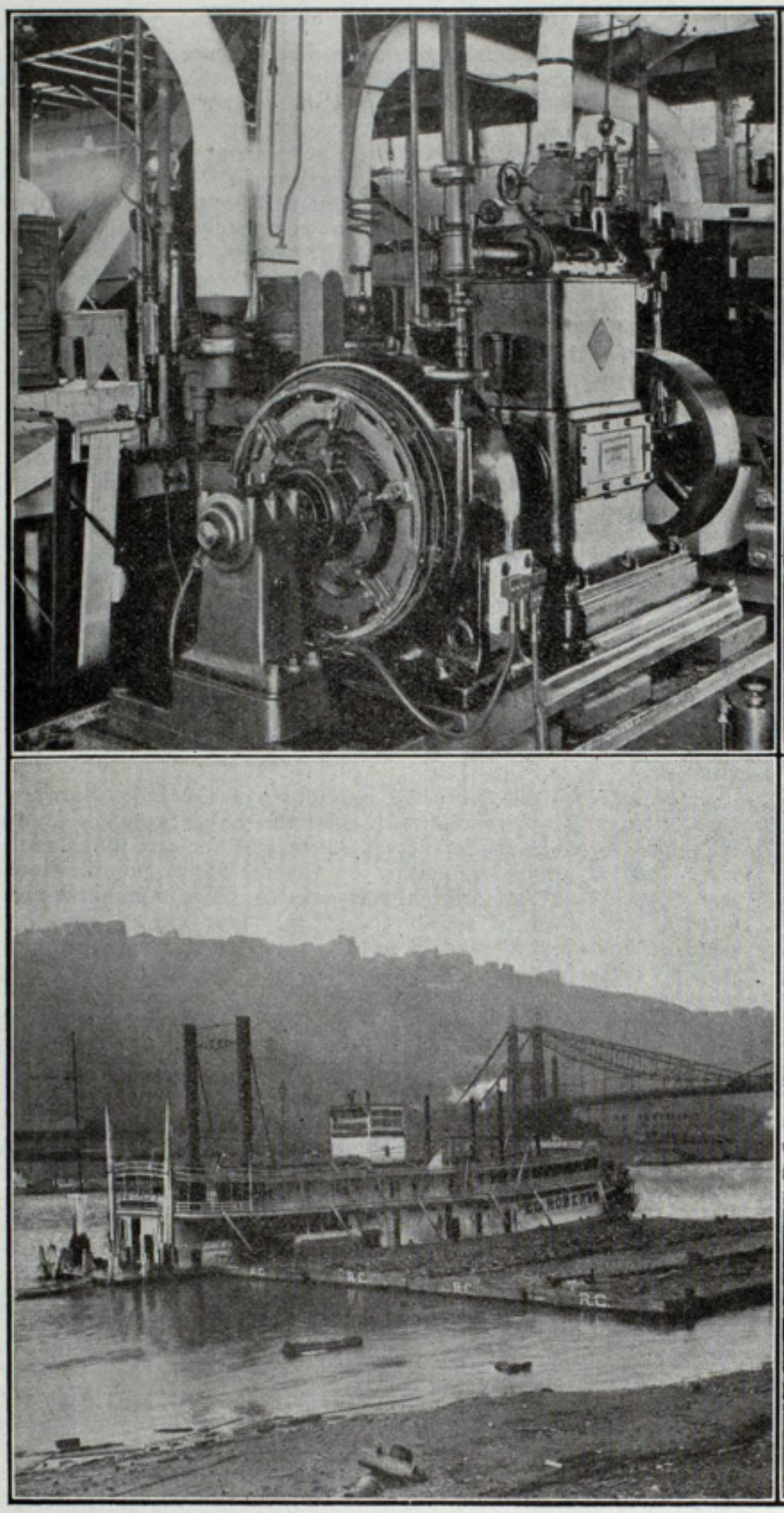
The Sherwin-Williams Co. of Cleveland is preparing to erect a very modern paint manufactory in Montreal. Contracts for the erection of the building will be let May 15. It is estimated that the building, when completely equipped with every modern appliance, will cost $200,000. The site upon which the building will be erected adjoins the one on which the company's varnish factory now stands. The company has been established in Montreal for seven years. The structure now occupied by the paint factory is a rented one. Extensive improvements in the Chicago plant of the company are now under way.

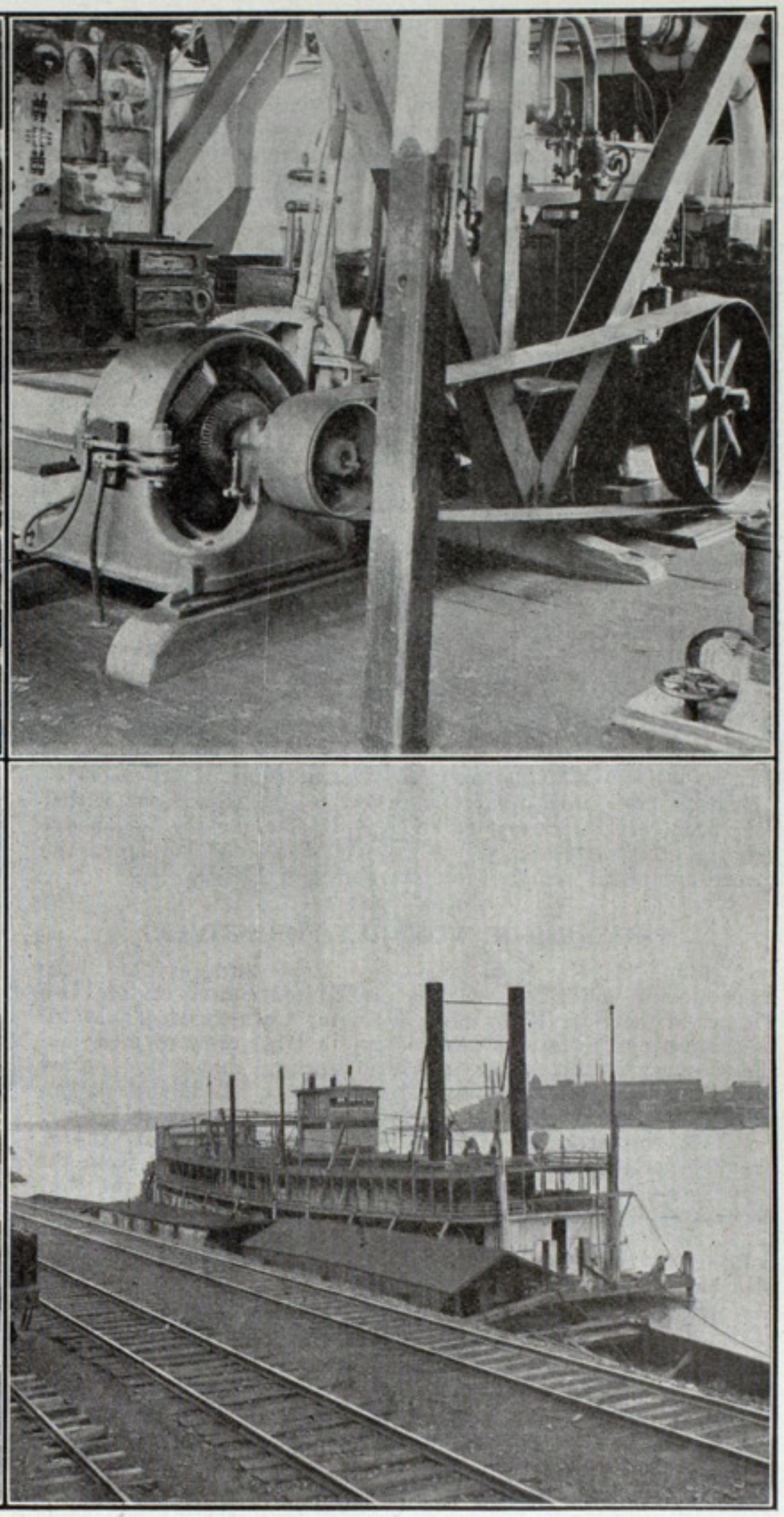
At a meeting of the stockholders of the Barry Transportation Co., held in Cleveland this week, Messrs. L. P. Smith, George H. Garrett, M. A. Lander, George W. Hausheer and Miles Barry were elected directors. The directors in turn elected the following officers: L. P. Smith, president; Wood T. Campbell, vice-president; Peter Barry, secretary; George W. Hausheer, treasurer and Miles Barry, general manager. The company will operate the Badger State and Empire State between Cleveland and Detroit. It is expected that by the latter part of next week the boats will be in operation. The steamer City of the Straits, which has been chartered by the People's Popular Line (probably an adjunct to the Detroit & Cleveland Navigation Co.) to run between Cleveland and Detroit, will go into commission this week. This will give a service of five vessels between the two cities.

Members of the executive committee of the Lake Carriers' association and the representatives of the Lake Seamen's union who have been in conference in Cleveland for two days past, have reached an understanding on several minor points which were obscure in the original agreement. The committee desired to extinguish, if possible, the clause granting 25 cents pay per hour for overtime and to substitute in lieu thereof the wages paid to firemen—that is $47.50 per month instead of $45. The seamen, however, did not desire the change and the committee accordingly did not press it. The objectionable feature of the overtime clause from the master's standpoint is the bookkeeping which it involves. The seamen, which includes all the deck crew, will, coming in and going out, stand watch and watch and while in port ten hours will constitute a day's work. All the large barges will carry six seamen. The whaleback barges that have towing machines will carry four seamen.

A controversy prevails between the bureau of steam engineering of the navy and the authorities at the naval academy on account of the location of the new engineering laboratory and experimental station which is to be added to the educational features of the academy. Several sites have been chosen by the naval engineering authorities on the academy reservation but the superintendent in each instance has interposed some objection to an approval of the selection, usually on the ground that the particular site is intended for some other purpose. Plans have not yet been made for the engineering laboratory but the navy officials are gathering material from abroad likely to be of use in the plans. The first difficulty to be settled is the question of a site and the present prospect is that the matter will be carried to the secretary of the navy for his decision, the question having reached the acute stage of impatience on both sides. Meanwhile the request of the superintendent of the department for some twelve or fifteen launches, which he intended to employ in the engineering instruction of midshipmen, has been denied. It was held that midshipmen could not be instructed in engineering by means of a steam launch.

Lighthouses on Lake Michigan, long cared for by the steamer Dahlia, will after June 15 be attended by a new steamer. The vessel, which will be named the Sumac, is nearing completion at Port Richmond, N. Y., and will be sent to Chicago as soon as fitted for service. The new boat, which is 160 ft. long and of 30 ft. beam, will cost when completed $125,000. She will be fitted with large oil and gas tanks and will be capable of long cruises with supplies. On the arrival of the Sumac it is said the Dahlia, which has been the lighthouse tender on Lake Michigan since the ninth lighthouse district was established in 1887, will be given headquarters at Milwaukee, or some other northern port, and will assist the Sumac in duty on Lake Michigan. The Dahlia was built at Philadelphia for the lighthouse board in 1874. Because of his long experience on Lake Michigan as commander of the Dahlia, Capt. C. H. Hubbard will be transferred to the Sumac. His successor on the Dahlia's bridge has not been named. For several years the Dahlia has been a hard worked craft, for the increase in the number of lighthouses on the lake has been great. Her capacity for supplies has been limited and she has been forced to make many trips to complete a season's work. Thursday the Dahlia reached Chicago from her first trip around the lake this year. Important work was done in placing gas buoys on new shoals near Waugoshance light, the last dangerous shoals without lights in Lake Michigan. One shoal is 2⅛ miles northwest and the other 2⅝ miles northwest of Waugoshance light.





LIGHTING OF RIVER STEAMBOATS.

In the above illustrations are shown a couple of steamboats belonging to the Monongahela Coal & Coke Co. of Pittsburg, as well as Westinghouse motors, direct and belt-connected to Westinghouse junior-type engines, that are used on the steamers. These motors furnish current in each case for about 150 incandescent lamps and for two searchlights of 8,000 candle-power and 4,000 candle-power respectively. They range from 15 to 30 kilowatts capacity and are installed on nine of the boats of the Monongahela company, namely the W. W. O'Neil, the Chas. Brown, Fred Wilson, Josh Cook, Ed. Roberts, Iron Age, Tom Dodsworth, James Moren and John Moren. The company officials and officers of the boats express universal satisfaction with the service rendered.

SHIP BUILDING AT NEWPORT NEWS.

Newport News, Va., Aprjl 29.—The new steamship Francis H. Leggett, built at the local ship yard for the Hammond Lumber Co., sailed Saturday on her maiden trip to San Francisco. She will go by way of the Straits of Magellan and will probably stop at Montevideo for coal. It is expected that from sixty to seventy days will be required to complete the voyage, as the ship is not a fast one, having been built for the redwood trade along the coast of California and also for towing purposes. She will average about 10 knots an hour. The Leggett's cargo will consist of two locomotives, which are carried on deck, and a large consignment of steel rails. On the trip around to the Pacific the Leggett will burn coal, but after entering her owner's service she will burn oil as fuel, having been equipped with burners. The ship is commanded by Capt. Edward Jahnsen. The Leggett is the third ship built here for the Pacific trade, having been preceded some months ago by the monster Pacific Mail leviathans, Korea and Siberia.

The United States battleship Missouri and the German cruiser Gazelle have been floated out of dry dock No. 2 at the ship yard. These two ships were docked end to end in the same basin. It is reported that one of the large battleships of the North Atlantic squadron will be sent here for docking after the review of the squadron off the Virginia capes by Admiral Dewey as the navy yards have not facilities for handling all of the battleships to be sent across the sea at one time. It may be necessary, if the navy department is in a hurry for the ships, to send more than one of the vessels here for docking. Any two battleships or cruisers in the navy may be docked in No. 2 basin at the ship yard at the same time with room to spare.

It is now reasonably certain that the armored cruiser Maryland will be launched in June, although the date has not been announced.

A model of the Morgan Line steamship El Sud, one of the first quartet of liners built here for that line in the '90's, has been mounted in the general office building at the ship yard. This model was on exhibition at the Chicago and Atlanta expositions.

The battleships Massachusetts and Texas have arrived in Hampton Roads from Pensacola and the other battleships of the North Atlantic squadron have arrived at the Virginia capes to prepare for the review and general inspection of the ships. The flag of Rear-Admiral Higginson was hauled down this week from the Kearsarge and the flag of Rear-Admiral Barker run up, that officer having succeeded to the command of the squadron. The Texas will be retained on the North Atlantic station, it is understood, as flagship of the so-called home protection squadron, which will do temporary duty while the main squadron is on its Azores cruise.

The Merritt & Chapman Wrecking Co. is endeavoring to float the four-masted schooner Charles H. Davenport, which went aground at Old Point. The ship, which was light, has a large hole in her bottom. Rear Admiral Harrington, commanding this naval station with headquarters at the navy yard, and Count von Oriola, met officially last week.

On the "Lines" of Fast Cruisers.*

By Vice-Admiral C. C. P. FitzGerald.

In bringing this subject before the notice of this institution, I may say at once that I do so more as an inquirer than with the idea of laying down the law dogmatically as to what are or are not the best possible lines upon which ocean cruisers of high speed ought to be built: and, whilst venturing to offer some opinions on the subject from a seaman's point of view, I shall hope to evoke the opinions of some experienced naval architects upon the theoretical aspect of this interesting and important question, with the further hope that theory and practice may be found to go—as they ought to go—hand in hand. Both professional and naval architects and professional seamen know perfectly well that it is impossible to get high speed in any vessel without fine lines, and it is equally impossible to get very high speed without very fine lines. This sounds almost like a truism to those who know anything about the subject. No amount of horse power will avail unless the co-efficient of fineness bears a certain relation to the speed required: but it appears to me that there is a great deal of difference between fine lines and hollow lines; and this brings me directly to the point which I trust some naval architects here present will elucidate for us, viz., whether there are any special advantages in hollow lines which are not apparent to the eye of a seaman, or which can be taken as an adequate compensation for the disadvantages which he knows them to possess in all conditions of wind and weather, with the sole exception of dead smooth water—a condition which, I need scarcely say, is very rare at sea.

I may perhaps point out here what I mean by reference to the diagram on Plate I. This diagram shows the water-line of our armored cruisers of the County class, and I think it can be scarcely open to question that their lines are very hollow, particularly the bow lines. I may observe that the ships themselves look even more hollow than the diagram shows, though this, of course, may be an optical delusion. I have ventured to add to the original diagram a dotted line showing an imaginary waterline which is not hollow, but slightly convex, and approaching more nearly to the lines of our 30-knot destroyers, and of fast Atlantic liners, and I would ask the question whether these lines would require a greater horse power to drive them at a given speed than the hollow lines, even in smooth water? And, if this question is answered in the affirmative, I would still point out that by filling in this hollow, the ship would be given a greater displacement, and would in consequence be able to carry a greater weight of engines and she would certainly be a better ship in rough water, even if there was a slight falling off in her trial trip speed.

I am quite aware that, generally speaking, comparisons between the designs of war cruisers and Atlantic liners are apt to be misleading, as the ships are intended to perform totally different services, and it is impossible to combine the requirements of both in any one ship. It is not necessary to enter into the details of this incompatibility, as they must be obvious to both naval architects and seamen; but there is one quality which is essential to both, and that is, length. You cannot drive a short ship against a head sea: it is simply impossible. Length is necessary in order to get anything like high speed in rough water; and, moreover, total length, or length over all, is of no use unless it is combined with length of floor; it is, in fact, actually detrimental, as it only increases the pitching moment. A comparatively broad and flat floor amidships, with two very fine and hollow ends, will only make a rocking machine, which may possibly be driven fast in smooth water, and may be suitable for a river steamer, but which is quite unsuitable for an ocean cruiser. I put forward these views on the subject as the crude remarks of a seaman, subject to the contradictions of applied science; but they are the result of many years' observation of the behavior of ships and vessels of various classes, in all conditions of wind and weather, and they must be taken for whatever they are considered worth.

In comparing the lines of our larger ocean war cruisers with those of destroyers, it is obvious that in the latter the proportion of length to breadth is greater than in the former, thus admitting of finer lines, and this length is no doubt necessary in order to get space for boilers enough to produce the great horse-power required to drive these little vessels at 30 knots; but in examining the drawings of destroyers, and in looking at the vessels themselves, I am unable to see any hollowness in their lines. The lines appear to be almost quite straight, and in some boats slightly convex, until you get aft as far as the boiler space; and yet these little vessels (putting on one side some signs of structural weakness) have proved themselves to be splendid sea boats for their size, weathering Atlantic gales and typhoons in the China seas.

I desire to speak with the greatest respect of tank experiments. I have not the smallest doubt that they have been of great use to naval architects in elucidating problems in hydrodynamics, and in assisting them to come to conclusions as to the form of model which offers the least resistance at various speeds. Such experiments and researches must always be useful in checking theory with practice, so far as such trials can be considered practical; though it must be borne in mind that all tank experiments relate only to smooth water conditions, and it is quite possible that the conclusions arrived at through a combination of abstract theory and tank experiments with small models may be misleading, if applied too rigidly to full-sized ships which have to travel upon the troubled surface of the ocean. Indeed, it is impossible to help surmising that tank experiments are responsible for the hollow lines of which I am

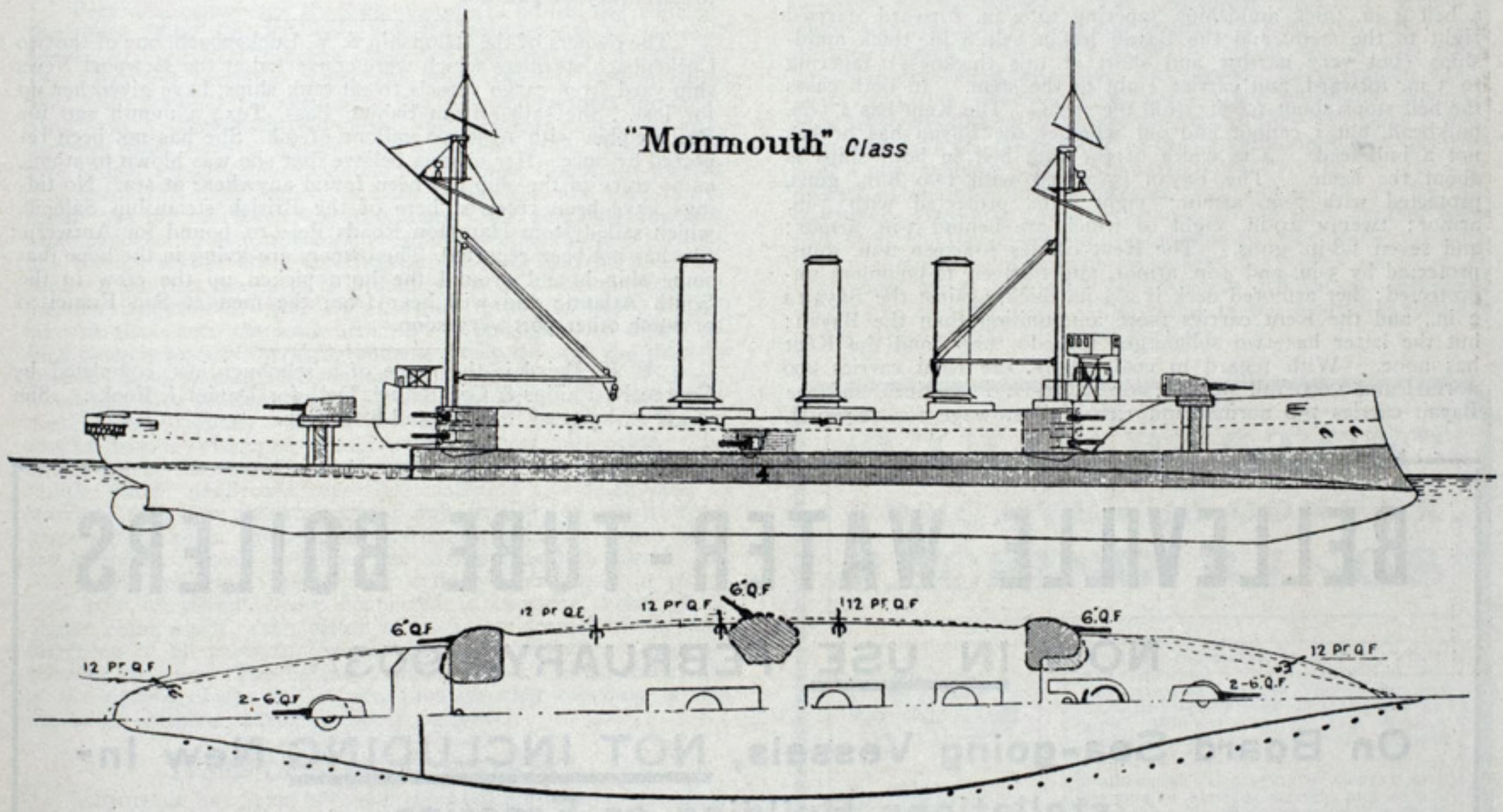


Plate 1. Showing the lines of the Monmouth class.

*Read at the spring meeting of the Institution of Naval Architects.

now speaking. If I am wrong in this surmise, I shall, no doubt, be corrected.

Some years ago we used to hear a good deal about the "wave line" theory; in other words, a hollow bow. Speaking from memory, I think it was introduced—or, at any rate, advocated—by the late Mr. Scott Russell; but I have certainly been of opinion that this theory has since been discredited, both by naval architects and seamen, for all ocean-going steamers, although it is possible that it may still be applied with success to river steamers; at any rate, it is certain that you will not see a hollow line in any of our fast Atlantic liners. Splendid models of these ships are on view in many public places, particularly in Cockspur street, so that anyone can see for himself that there is no hollow in the bow lines; but that, on the contrary, the floor of the ship is carried right forward to the cutwater—a form which enables the vessel to rise to a sea, instead of pitching deeply into it.

It has often been urged that comparisons between British and foreign cruisers are apt to be misleading, and unfair to the former unless the full particulars are known and set forth. This, no doubt, is perfectly true, but yet, in spite of the very high authority by which this warning has been issued, I think it will not be irrelevant to the present subject to compare the British Kent of the County class with the Russian cruiser Bayan, built at La Seyne. The Kent has a nominal tonnage of 9,800, the Bayan 7,800, and there can be no doubt that the additional 2,000 tons ought to give a great superiority to the Kent either in speed, armor, armament, or coal endurance. With regard to armor, there does not appear much to choose between them, although the distribution of it is different; thus the Kent has a belt 4 in. thick amidships, tapering to 2 in. forward, carried right to the stem, and the Bayan has a belt 8 in. thick amidships (but very narrow and short at this thickness) tapering to 3 in. forward, and carried right to the stem. In both cases the belt stops about 100 ft. from the stern. The Kent has a 5-in. bulkhead, but I cannot find out whether the Bayan has or has not a bulkhead. The width of the thin belt in both ships is about the same. The Bayan is armed with two 8-in. guns, protected with 7-in. armor; eight 6-in., protected with 3-in. armor; twenty 2.9-in., eight of which are behind 3-in. armor; and seven 1.8-in. guns. The Kent carries fourteen 6-in. guns, protected by 5-in. and 4-in. armor, and thirteen 12-pounders unprotected; her armored deck is 2¾ in. thick, against the Bayan's 2 in., and the Kent carries more ammunition than the Bayan; but the latter has two submerged torpedo tubes, and the Kent has none. With regard to coal supply, the Kent carries 800 normal and 1,600 full stowage for 22,000-H. P. engines, and the Bayan carries 750 normal and 1,100 full stowage for 16,500-H. P. engines. The Bayan was designed for 21 knots and made 22 on her trial. The Kent was designed for 23 knots and made 21.7 on her first trial; and, although she has somewhat improved upon that, owing to some alteration in her screws, she has not yet attained her designed speed; nor have any of her sisters. Presumably the Bayan's trial lasted for only three hours and the Kent's for eight. The Bayan is 445 ft. long by 57 ft. beam, and the Kent is 440 ft. long by 65 ft. beam. The 5 ft. additional length, coupled with 9 ft. less beam, commands itself to the mind of a seaman as being a better form than the other one for driving against a head sea, and it seems to be no worse for attaining a good trial trip speed. I have not been able to get the lines of the Bayan. It is difficult to get the lines of foreign ships, but I have seen a good many French-built ships and I can safely say that I have never been able to detect a hollow line in any of them.

In the above comparison I have endeavored to be perfectly fair and have impartially given such information as I have been able to collect, and it certainly does not appear as if our County class of 9,800 tons possess such a superiority over the Bayan of 7,800 tons as they ought to possess. It would be interesting to know if this is in any way attributable to their hollow lines.

It is always rash to prophesy, and yet I will venture to predict that the whole of our County class will prove to be very wet ships. They will be wet for two reasons. One is that their sponsons are too low, and the other is that they have hollow lines, particularly the bow lines; and this, in combination with the armor carried right forward to the stem, will make them pitch with all the venom of much shorter ships, and it must be remembered that a wet ship interferes considerably with the accuracy of gun fire.

The owners of the steamship S. V. Luckenbach, one of the two Luckenbach steamers which were converted at the Newport News ship yard from cargo vessels to oil tank ships, have given her up for lost. She sailed from Sabine Pass, Tex., a month ago for Philadelphia with 1,250,000 gallons of oil. She has not been reported by once. Her owners believe that she was blown to atoms, as no trace of the ship has been found anywhere at sea. No tidings have been received here of the British steamship Salopia, which sailed from Hampton Roads Feb. 10, bound for Antwerp. She has not been reported. The owners are living in the hope that some ship bound around the horn picked up the crew in the South Atlantic and will hear from the men at San Francisco or some other port very soon.

E. K. Baird is the name of a schooner just completed by George K. Philips & Co., Bethel, Del., for Daniel J. Fooks. She is 132 ft. long, 28 ft. beam and 8 ft. deep.

BELLEVILLE WATER-TUBE BOILERS

NOW IN USE (FEBRUARY, 1903)

On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.

French Navy	276,460	H. P.
English Royal Navy	849,300	"
Russian Imperial Navy	193,900	"
Japanese Imperial Navy	122,700	"
Austrian Imperial Navy	32,900	"
Italian Royal Navy	13,500	"
Chilian Navy	26,500	"
Argentine Navy	13,000	"
The "Messageries Maritimes" Company	87,600	"
Chemins de fer de l'Ouest: (The French Western Railway Co.) Steamships plying between Dieppe and Newhaven	18,500	"
Total Horse Power of Boilers in Use	1,634,360	

WORKS: Ateliers et Chantiers de l'Ermitage, at Saint-Denis (Seine), France.

TELEGRAPHIC ADDRESS: Belleville, Saint-Denis-Sur-Seine.

ARMORED CRUISER COLORADO LAUNCHED.

The armored cruiser Colorado was launched from Cramps ship yard, Philadelphia, last Saturday. This vessel is 502 ft. long, 59 ft. 6 in. wide and draws 24 ft. 6 in. Her speed requirement calls for 22 knots an hour for four consecutive hours. She is fitted with twin triple-expansion engines capable of developing 23,000 H. P. All the armor is of the most improved Krupp type. The waterline region is guarded by a 7½-ft. belt reaching from bow to stern. Amidships, for a distance of 244 ft. abreast the engines, boilers and magazines, the belt has a maximum thickness of 6 in. Forward and aft this belt will have a uniform thickness of 3½ in. Five-inch armor will surround the 6-in guns at the four corners of the superstructure on the main deck. The four 8-in. guns are mounted in two balanced turrets, with slanting faces, having armor 6 and 6½ in. thick. A belt of cellulose, extending from bow to stern above the protective deck, will automatically plug all shot holes admitting water.

The fighting force of the Colorado is centered principally in two batteries. She will carry a main battery of four up-to-date 8-in. and fourteen 6-in. rapid-fire rifles, a secondary battery of eighteen 14-pounders and twelve 3-pounders, and a supplemental force of eight 1-pounders, two field-pieces, two machine guns and six automatic guns for service on the bridges and in the tops. The 8-in. guns are designed to fire once every fifty seconds and the 6-in. guns three times a minute. The contract price of the Colorado was $3,780,000.

TRADE NOTES.

Albert Frank & Co., general advertising agents, will remove on or about May 1 to the Board Exchange building, 25 Broad street, New York.

Very interesting are the two pamphlets which the Chicago Pneumatic Tool Co. has just issued—one devoted to its tool factory in Cleveland and the other the tool factory at Detroit. The Cleveland pamphlet deals with drills and the Detroit pamphlet with hammers. Concerning the care of hammers the company says: "Pneumatic hammers, like all other classes of machinery, must receive proper care and lubrication in order to give proper results, therefore, one of the most important factors connected with their care is to keep them clean and well lubricated. As the air taken into the compressor generally contains some particles of grit and dust, it is almost impossible to prevent this foreign matter from entering into the working parts of the hammer, causing the parts to become clogged and rendering the hammer inoperative. The use of a poor grade of heavy-bodied oil will also cause the same trouble. A good plan to follow in such cases is to clean by using benzine freely through the throttle handle. This dislodges all foreign matter and cuts the thick oil which can then be removed by blowing the air through the hammer." The pamphlet contains an excellent comparison as to cost of hand and hammer-driven rivets on structural work. The advantage is, of course, greatly in favor of the hammer. All "Little Giant" drills and reversible machines are made after a standard design or pattern, varying only in size and construction necessary to adapt them to the particular uses for which they are intended. These machines are of the balanced piston type and consist of four single-acting cylinders, arranged in pairs, each pair of pistons being connected to opposite wrists of a double crank shaft; each piston of each pair travels in opposite directions at all parts of the stroke, thereby insuring a smooth running machine. The balanced piston valves are set to cut off at five-eighths of the full stroke, thus insuring economy in the use of air without sacrificing speed or power.

ITEMS OF GENERAL INTEREST.

Misfortune has again attended the battleship Iowa. A steam pipe burst and tore away the steering gear. The ship is now at Pensacola where she will be repaired.

Members of the original United States Steel Corporation syndicate, who put up $25,000,000 in cash and stood liable to have put up $175,000,000 more, received last week from J. P. Morgan & Co. notice of the dissolution of the syndicate and of their final share in the distribution of profits, aggregating about $50,000,000, or 200 per cent. Their original cash deposit of 12½ per cent. was long ago returned.

Chief Engineer Towne of the Cramp ship yard called at the navy department last week and conferred with the officials regarding the Maine's boilers. Mr. Towne, after a thorough examination of the battleship at League island, insists that the bending and bursting of the tubes in the boilers was due to the incompetency of the engineers and that if the boilers had been properly handled the accidents would not have occurred.

The life-saving device known as the Carley float, and which has several times been referred to in these columns, is meeting with great favor among yachtsmen along the Atlantic seaboard. This device is so well suited to saving life under various conditions and is so easily handled—it is very light of weight and needs simply to be thrown overboard—that it will certainly come into general use on all kinds of vessels. Among yachts from which orders have recently been received are the Delaware, Aloha, Thesis, Aztec, Dreamer, Pantooset and several others.

Last year was an exceptionally good one for the General Electric Co. The profits were $10,277,000. Total sales of electrical apparatus and supplies amounted to $36,665,598, while the orders received amounted to $39,944,454, being an increase of 16 per cent. upon orders received during the year ending Jan. 31, 1902. After making allowance for the purchase of patents, chiefly those of the Sprague Electric Co., and after a stock issue restoring the percentage of reduction made in 1893 of $16,746,133.33, and after paying dividends and interest on debentures there remained a surplus at the close of the fiscal year of $4,482,701.99. The capital stock of the company is $41,880,733.33.

Irving M. Scott, for many years vice-president and general manager of the Union Iron Works, died at his home in San Francisco this week. He had not been in health for a long time but his death was unexpected. He was one of the most progressive ship builders in the world. The Oregon is the most famous vessel which he built, owing to her spectacular tour around the horn during the incipient stages of the Spanish-American war; but naval men have always looked upon the Olympia as the best product of the Union Iron Works. The Olympia was regarded for her size as the best balanced ship in the navy. Mr. Scott was very active in public life and was twice mentioned as a candidate for vice-president of the United States.

Vessel men of the great lakes have had during the week a striking example of the necessity of whipping a union when it deserves to be whipped. The settlement with the firemen's union has apparently given the firemen an erroneous impression of their power. They have made trouble at one or two ports since the agreement with them was signed. At Cleveland it appears that they endeavored to enforce the moribund principle that seniority should be observed—that is they held that a fireman who was an old member of the union should have priority over a new member. This, of course, virtually destroyed the first precept of unionism but the firemen could not see it. At Buffalo the union refused to allow a vessel to go out until another oiler had been employed, though the agreement specifically provides that nothing must delay the movement of vessels but that all differences which arise must be settled by arbitration. All these things are merely effects. The cause is the original surrender of the vessel men to an unjust demand.

"VULCABESTON"
CONCAVE and CONVEX
PACKING RINGS



Used by representative power stations and steam plants for the Piston Rod, Reciprocating and Corliss Valve Stem and Throttle Stem Packing on stationary engines. Will not score the rod. Readily conform to any uneveness in the rod and greatly reduce friction.

Made in pairs Concave and Convex split diagonally, opened laterally and sprung over the rod. This formation tends to press the Convex Rings closely to the rod and the Concave Rings to the box, preventing leakage of steam at either side. Practically indestructible. Will pack satisfactorily against high pressure or superheated steam, and work perfectly in vacuum.

SEND FOR CATALOGUE "V"

SHEET PACKING
30 to 50 per cent. cheaper than rubber or composition packing More durable and efficient.

ROPE PACKING
Braided from pure Asbestos yarn vulcanized with Rubber.

NEW YORK MILWAUKEE CHICAGO ST. LOUIS BOSTON
H.W. JOHNS-MANVILLE CO 100 WILLIAM ST. NEW YORK
PHILADELPHIA CLEVELAND PITTSBURG NEW ORLEANS LONDON

United Marine Mfg. & Supply Co.,
MANUFACTURERS OF AND DEALERS IN
ELECTRICAL MATERIAL
ALBERT C. JAHL, General Manager,
100 William St., New York, U. S. A.
FOR SHIPS AND FORTIFICATIONS.

NEW CHARTS.

J. D. Potter, admiralty chart agent, 145 Minories, London, announces the following new charts:

2253.—England, south coast—Dartmouth harbor.
3292.—Scotland, west coast—Loch Alsh and Kyle Rhea.
1624.—England, east coast—Scarborough bay.
2330.—Norway, south coast—Christiania fiord.
151.—France, south coast—Toulon harbor.
3330.—Iceland, east coast—Seidis fiord and trading station.
3323.—Newfoundland, east coast—Hall bay and Sunday cove. Newfoundland, Trinity bay—3306, Smith and Random sounds, eastern part; 3307, Smith and Random sounds, western part.
3273.—The West Indies.
3322.—South America, northeast coast—Orinoco river.
3279.—China—Hongkong waters east.
1288.—China, Yang-tse-Kiang—Chin Kiang fu and Silver island. New Zealand, east coast—3328, Kati Kati harbor; 3321, Gisborne roads.
2747.—Australia, south coast—Entrance to Port Phillips, etc.
927.—Philippine islands—New plan, Port Romblon.
991.—Japan, anchorages on the coast of Yezo island—Plan added, Monbetsu road.

Charts that have received additions and corrections too large to be inserted by hand are:

2296.—Gulf of Bothnia, sheet 1—South Quarken to Hornslandet.
3300.—Baltic sea—Windau.
790.—Denmark—Approaches to Copenhagen.
2690.—France—Brest roadstead.
366.—Cape Verde islands.
2740.—Iceland and the Foeroe islands.
546.—South America, east coast—Espirito Santo bay and Port Victoria.
Africa, south coast—2095, Cape of Good Hope and adjacent coasts; 385, Plettenberg bay; 1223, Kowie river entrance.
Africa, east coast—643, Port Natal; 2908, Port Natal entrance; 597, Delagoa bay to Guardafui; 644 Delagoa bay; 646, English river bar and harbor; 650, plans on the east coast of Africa; 921, Chiluan island; 1421, river Chinde; 2865, mouths of the river Zambesi; 653, ports of Conducia, Mozambique and Mokambo; 684, Mto Mwara and Mikindani harbors; 681, Lindi river; 677 Mchinga bay; 687, Kiswere harbor; 661, Kilwa Kisiwani; 458, Mafia island and channels; 674, Dar es Salaam; 1310, southwest coast of Pemba island; 1812, west coast of Pemba island; 663, Mansa and Tanga bays; 238, Kilifi river and approaches; 667, Port Malindi and approaches; 1747, Lamu harbor; 669, Lamu, Manda, Pata and Kwyhu bays; 860, Kisimayu bay; 671, plans on the east coast of Africa.
760.—Madagascar, south portion—Cape St. Mary to Bevato island and Matatane.
758.—Madagascar, northern portion—Cape St. Andrew to Antongil bay.
Madagascar—692, St. Augustine and Tullear bays; 2464, Nosi Andrianmitarika to Mananonoka point; 1036, anchorages on the coast of Madagascar; 378, Maromanjo point to Makambytra bay; 708, anchorages on the west coast; 701, Bombetoke bay; 377, Moramba bay to Maromanjo point; 702, Mahajamba bay; 704, Nosi Shaba to Moramba bay; 706, Pasindava and adjacent bays; 707, Ambavatobi bay; 1002, Diego Suarez bay to Andranoaombi bay; 317, anchorages on the northwest coast; 1054, ports and anchorages in the northern portion; 1064, plans on the northeast coast; 1116, Diego Suorez bay; 680, anchorages on the east coast of Madagascar; 759B, Antongil bay to Ambatosoa; 686, anchorages on the east coast.
Indian ocean islands—563, plans in the Comoro islands; 2066, anchorages in Comoro islands; 851, Bassas da India and Europa islands.
833.—Bay of Bengal—Rangoon river.
Philippine islands—2987, San Pedro bay to Libukan islands, etc.; 976, Manila bay.
2062.—Cochin China—Tongking gulf.
913.—Korea, western coast—Mackan group to Clifford island.
2985.—Japan—Saiki bay.
1510.—Sandwich islands.

HANDY TOOL FOR SHIPBOARD.

A portable hand tool, for thread and pipe cutting, which it is claimed will do work heretofore requiring extensive stationary machinery for its execution, has lately been put on the market by the Kent Machine Works of 246 Plymouth street, Brooklyn. Several of the tools have been purchased by the government for use on war ships, where they are said to be giving entire satisfaction. The tool cuts a thread from 1 to 2 in. and from 2½ to 6 in. inclusive, with standard taper; cuts a close or long nipple from 1 to 2 in. or from 2½ to 6 in. diameter, with standard taper, and cuts off the pipe at any point desired without leaving burrs or irregularities, and is said to do its work better—and as quickly as a power tool, as it does not chatter, and its adjustment being automatic no time is lost in adjusting. It does not have to be placed in any fixed position and does not require skilled labor to manipulate it; has no dies to break or wear out, the only wearing part being the cutter, which, being made of self-tempering steel, may be ground without affecting its temper. It has no bushings to change in order to cut different sizes and no stocks to adjust, and cuts all threads, from the smallest to the largest, with the same expenditure of power, the size of pipe making no difference in its working. It can be carried to the work instead of the work having to be carried to it. There are no vises to be carted around, no pipe cutter to get mislaid or clamps to look after.

The manufacturers of this tool, which is called the improved Mason hand lathe, sav it has been their aim to produce a tool so thoroughly strong that there would be no weak part about it, and that would outlast a lifetime. There are other points about the tool of interest to those who have use for it, which will be furnished, with prices, etc., by the manufacturers.

BUSY MARINE PLUMBERS.

Alfred B. Sands & Son, well known plumbers' supply house of New York, has been compelled to secure larger quarters for their factory and warerooms, into which they will move May 1, but their general offices and show rooms will remain at the old stand, 143 Beekman street.

This firm has been kept exceptionally busy lately having contracts for furnishing the plumbing material and supplies for the steamship Minnesota and her sister ship Dakota, the largest ships ever built in America and having the largest carrying capacity of any ships in the world, which are now under construction at the New London, Conn., plant of the United States Ship Building Co. for the Great Northern Steamship Co. for transpacific service. Alfred B. Sands & Son are also supplying material of their line to the Atlantic transport ships building at the works of the New York Ship Building Co., Camden, N. J., and to other large craft. They are also fitting out a large number of yachts, among which is the cup defender Reliance and other yachts building at the Herreshoff works, Bristol, R. I., as well as yachts building on single design classes for various yacht clubs, and have just completed refitting the yacht Waturus, owned by Mr. Randall Morgan.

Extensive changes are contemplated in the plant of the Lake Shore Engine Works at Marquette, Mich. An electric traveling crane, the handiwork of Pawling & Harnsichfeger of Milwaukee, will be installed. It is also intended to run a spur from the railway directly into the foundry.

Steam Barge for Sale.

Steam barge William Rudolph. Capacity 250 M. ft. of lumber. Rates A 2½. Compound condensing engine put in this year. Boat in good condition. For particulars address A. F. Temple, Muskegon, Mich. May 28.

"Seaboard Steel Castings"

A Guarantee of Quality.

Open Hearth Steel Castings of the Highest Grade for Locomotive, General Machinery and Shipbuilding Work.

Subject to U. S. Government, Lloyds, Railroad and Other Highest Requirements.

Seaboard Steel Casting Co., Chester, Pa.

If you want to KNOW WHY

Dearing Water Tube Boilers are best? ? ?

Drop us a postal

Dearing Water Tube Boiler Company
288 to 296 Fort St., West. DETROIT, MICH.

PENNSYLVANIA STEEL CO'S REPORT.

At the annual meeting of the Pennsylvania Steel Co., held last week, all the directors were re-elected. President E. C. Felton in his report says in part:

"During the year the Pennsylvania Steel Co. of Pennsylvania completed its purchase of certain interests in the Cornwall ore banks, near Lebanon, Pa., and now owns forty-ninetysixths of that property, with a two-thirds interest in the Cornwall & Lebanon Railroad, and two modern blast furnaces at Lebanon. Bonds of the Pennsylvania Steel Co. specifically secured by mortgage on these properties were issued on Oct. 1, last, to the amount of $7,500,000, to pay for them and for by-product coke ovens to be erected at Lebanon.

"The Maryland Steel Co. has continued during the year the building of by-product coke ovens, which will have a capacity of about 1,000 tons of coke a day, and will supply about three-fourths of the coke consumed by its blast furnaces. It has also improved and enlarged the equipment of its steel and rolling mills. It purchased during the year 500 steel coal cars, paying for them with an issue of $600,000 car trust certificates. The ship yard has increased the size of its launching ways and made other improvements. This department completed during the year two 12,000-ton twin-screw freight steamships and three torpedo boat destroyers, and a large floating dry dock for the United States government. The Baltimore & Sparrow's Point Railroad, the securities of which are owned by your company, was successfully operated during the year. The double-tracking of its line and bridges was completed, the cost of these improvements being charged to operating expense.

"The end of the year finds the plants of all of these subsidiary companies in excellent condition and capable of producing a much larger output than during 1902. It is expected, however, that profits will be reduced owing to the very considerable advances which have taken place in the cost of fuel and in freight rates. No important additions or improvements are at present in contemplation other than the building of by-product coke ovens at Lebanon. These will cost about $800,000, which amount is in hand for the purpose. The operating companies owned have, after paying interest on bonded indebtedness, and after charging to general and special depreciation $1,522,481, earned net $2,473,532, out of which this company has received in dividends $1,177,500, and the balance, $1,296,031, has been retained by the operating companies for additions to plant and to working capital. In addition to the $820,085 charged to general depreciation by the operating companies, the sum of $713,396 was charged into their costs of manufacture. This amount was spent either for permanent improvements, or charged as a special depreciation to particular departments or to railroad equipment."

ISSUE OF STEEL CORPORATION BONDS.

President Charles M. Schwab for the United States Steel Corporation has formally executed the indenture for the proposed issue of $250,000,000 5-per cent. bonds and it has been accepted by the United States Trust Co. of New York. Of the total authorized issue of $250,000,000 of bonds, $50,000,000 are to be issued at once to the trustee for certification and delivered by him as may be directed by the Steel Corporation, while the remaining $200,000,000 will be reserved to be executed, certified and delivered when authorized by resolution of the directors or of the finance committee of the corporation. To secure the bonds the Steel Corporation has transferred in trust to the trust company the shares of various subsidiary companies. The following table shows the total amount of these stocks outstanding and the amount pledged under the mortgage:

Name of Company.	Shares Outstanding.	Shares Under Mtge.
Carnegie Steel	630,000	629,995
Federal Steel, preferred	532,609	532,609
Federal Steel, common	464,843	464,828
National Tube, preferred	400,000	399,974
National Tube, common	400,000	399,363
American Steel & Wire, preferred	400,000	399,985
American Steel & Wire, common	500,000	498,998
American Tin Plate, preferred	183,250	183,250
American Tin Plate, common	280,000	279,850
American Sheet Steel, preferred	245,000	244,977
American Sheet Steel, common	245,000	244,888
American Bridge, preferred	313,738	313,639
American Bridge, common	309,508	309,497
Lake Superior Consolidated Iron Mines	298,884	294,214

J. P. Morgan & Co. as managers of the underwriting syndicate will continue to receive deposits of preferred stock under the bond-conversion plan until May 16 when the optional rights of holders of the preferred stock will expire.

A series of articles on gas engines and their troubles by Mr. E. W. Roberts, which have been running periodically in Marine Engineering, have been lifted and reprinted into a book. Additional chapters on design, construction, powering and propulsion of launches have been added by Prof. W. F. Durand. The putting of these articles into book form was prompted by the reception which the articles received upon their first appearance.

May 15 has been selected as the date for launching the Eastland, the steel steamer building at the works of the Jenks Ship Building Co., Port Huron, for the Michigan Steamship Co. of South Haven, Mich.

REDUCED FARES VIA PENNSYLVANIA LINES.

Excursion tickets will be sold via Pennsylvania Lines as follows:

To St. Louis, Mo., April 29 and May 1, inclusive, account dedication ceremonies, Louisiana Purchase Exposition.

To New Orleans, La., May 1 and 3 inclusive, account the American Medical Association.

To St. Louis, Mo., June 6 and 17 account thirty-first saengerfest of North American Saengerbund.

To Boston, Mass., July 2 to 5, inclusive, account National Educational Association.

For particulars consult ticket agent of Pennsylvania Lines.

Sunday outing excursions on the Nickel Plate road begin April 19, 1903, to continue every Sunday until further notice. Fare $1 each person, in parties of five or more traveling together and returning same day. Tickets good between any two stations within a distance of 100 miles. For particulars apply to nearest ticket agent. E. A. Akers, C. P. & T. A., Cleveland, O. May 7.

Engine For Sale.

High pressure compound condensing engine. Cylinders 19 and 32 in. diameter by 26-in stroke. Nominal H. P., 46; effective H. P., 329. Designed by Harry W. Granger, Detroit. Built by Canadian Locomotive & Engine Co., Kingston, Ont. This engine has been thoroughly overhauled and is now complete and in first class condition. Apply to The Montreal Transportation Co., Kingston, Ont., or Montreal, P. Q. May 21.

Side-Wheel Passenger Steamer.

For Sale—Passenger and freight steamer Urania. British registry. Built at Milwaukee in 1875 and then named Flora. Rebuilt in 1899 with engines from revenue cutter Andrew Johnson. Wooden hull. Three decks. Length 180 ft.; breadth 27 ft. 4 in. Thirty-three staterooms, 98 berths. Allowed 98 first-cabin and 402 steerage passengers. Speed 13 miles. Electric light plant practically new. Engines and boilers were thoroughly overhauled when transferred to this hull and have been well kept up. Urania has been running between Cleveland and Port Stanley and fuel consumption for day and night trips on run was about 400 tons per month. Address Box 41, the Marine Review Pub. Co., Wade Bldg., Cleveland. tf.

Steamer Imperial for Sale.

Has been running with freight and day passengers (licensed to carry 220) between Windsor, Amherstburg and Pelee Island No cabin accommodations for passengers Screw steamer built at Toronto in 1866; rebuilt in 1897. Wooden hull of 109 ft. length and 22 ft. width. Steeple compound engines of 12 and 16 in. Engines were compounded only six years ago and have been well kept up. Boiler of ample size and in good condition. Address Box 42, the Marine Review Pub. Co., Wade Bldg., Cleveland, O. tf

U. S. Engineer Office, Grand Rapids, Mich., April 6, 1903. Sealed proposals for Repair of Piers at St. Joseph and Black Lake Mich., will be received here until 3 P. M., May 6, 1903, and then publicly opened. Information furnished on application. J. G. WARREN, Major Engrs. April 30



Tug, Scow, Etc.

For Sale.—Tug, scow and sand pump. All in good order. Price reasonable. Address Butler Bros., St. Paul, Minn. Apr. 30.

Steam Yacht for Sale.

Steam yacht, 35 ft. over all, 7-ft. beam. Fitted for salt water use. Burns kerosene. Is in fine order. Will be sold cheap. J. L. Alberger, 695 Ellicott Square, Buffalo, N. Y. Apr. 30.

PITTSBURGH WHITE METAL CO.
MANUFACTURERS OF THE BEST
BABBITT and ANTI-FRICTION
Metals
Known for any Purpose.
Made from the Best Materials.
Price and Quality Guaranteed and Always Consistent with the Market.
PITTSBURGH, - PA.

ANTONIO C. PESSANO,
President and General Manager.

GEORGE H. RUSSEL,
Vice President.

JOHN R. RUSSEL,
Secretary-Treasurer.

GREAT LAKES ENGINEERING WORKS

DETROIT, MICH.

Steel Ship Builders—

We have under construction a complete Ship Building Plant, modern in every detail and capable of handling the LARGEST SHIPS which the trade of the Great Lakes will require; also

Floating Dock—

A Floating Dock of all steel construction and equipped with the best pumping machinery and appurtenances, and with a capacity for Docking the largest Boats afloat or which may be built.

Marine Engines—

We build High Grade Engines for Lake and Ocean Service.

Propeller Wheels—

Improved designs of high efficiency, made of Semi Steel, either whole or sectional.

Hydro Carbon System—

We are the sole owners of the rights for applying this system to the Steamers of the Great Lakes. If your boilers are using too much coal, if you are short of steaming capacity, if you want to convert the objectionable black smoke into money, the HYDRO CARBON SYSTEM should receive your attention, as it successfully and economically handles each of the above cases.

Hydraulic Dredges—

We build all sizes for any service.

Marine Repairs—

and Supplies of all kinds, and Heavy Forgings.

Books on Naval Architecture, Ship Yard Practice, Seamanship, Etc.

AMERICAN MERCHANT MARINE—Winthrop L. Marvin. A history of American Ships and Shipping. $2.

AMERICAN PRACTICAL NAVIGATOR---Nathaniel Bowditch. $2.25.

DATA BOOK—Naval architects and engineers' data book. By T. H. Watson. A reliable and simple means of recording valuable data, etc., of vessels and engines. Size of book, 8¾ in. by 5 in., cloth, $1.50

ELEMENTARY STEAMSHIP—by Barker. New and enlarged edition. $2.50.

ELEMENTS OF NAVIGATION---Henderson. $1.

HAND BOOK OF ADMIRALTY LAW---Robt. M. Hughes. $3.75.

HINTS ON LEGAL DUTIES OF SHIPMASTERS--- B. W. Ginsburg. $1.75.

ILLUSTRATED NAUTICAL ENCYCLOPEDIA--- Howard Patterson. $3.

INTERNATIONAL SIGNAL CODE—Bureau of Navigation. New Edition. $3.00.

KNOW YOUR OWN SHIP---Thos. Walton. $2.50.

MANUAL OF ALGEBRA---R. C. Buck. For the use, more especially, of young sailors and officers in the merchant navy; numerous examples and exercises. $1.50.

MARINE INSURANCE. W.Gow. $1.50.

MARINER'S COMPASS IN AN IRON SHIP: How to keep it efficient and use it intelligently. J. W. Dixon. $1.

MODEL ENGINES AND SMALL BOATS---N. M. Hopkins. New methods of engine and boiler making; ship design and construction; fifty illustrations. $1.25.

MODERN SEAMANSHIP---Lieut. Com. Austin M. Knight, U. S. N. Adopted as the text book of the United States Naval Academy. $6.

MODERN PRACTICE OF SHIP BUILDING IN IRON AND STEEL---Samuel J. P. Thearle. 2 volumes. Second edition, revised and enlarged. $5.25.

NAVAL ARCHITECTURE: A treatise on laying off and building wood, iron and composite ships. Samuel J. P. Thearle. In two volumes. $3.

NAVAL ARCHITECTURE: A manual on laying off iron and steel vessels---Thos. H. Watson. Valuable for naval architects as well as beginners in ship yards. $5.

NAVAL ARCHITECTURE---Sir W. H. White. New Edition. 750 pages. $9.

NAVAL ARCHITECTS AND SHIPBUILDER'S POCKET BOOK---Clement Mackrow. Formulae, rules and tables, and marine engineers' and surveyors' Handy Book of Reference. Eighth edition, revised and enlarged. $5.

NAVIGATION SIMPLIFIED---C. E. McArthur. Containing all problems required for U. S. Local Inspector's Examination or Masters and Mates of seagoing vessels $1.00.

POCKET BOOK OF MARINE ENGINEERING, RULES AND TABLES---Seaton and Rounthwaite. For marine engineers, naval architects, superintendents and others engaged in construction of marine machinery. $3.

PRACTICAL INFORMATION ON THE DEVIATION OF THE COMPASS, for the use of Masters and Mates of Iron ships---J. T. Towson. $2.

PRACTICAL SEAMANSHIP FOR USE IN THE MERCHANT SERVICE: Including all ordinary subjects; also Steam Seamanship. Wreck Lifting, Avoiding Collision, Wire Splicing, Displacment, and everything necessary to be known by seamen of the present day. Second edition, illustrated. John Todd and W. B. Whall. $8.40.

RESISTANCE AND PROPULSION OF SHIPS--- Durand. $5.

RESISTANCE AND PROPULSION OF SHIPS--- By Taylor. $3.75.

SELF-INSTRUCTOR IN NAVIGATION AND PRACTICAL GUIDE to the examinations of the U. S. Government Inspectors for masters and mates of ocean going steamships and sailing vessels—Capt. W. J. Smith. Second edition, revised and enlarged. Cloth bound. $2. Paper bound, $1.50.

SELF-INSTRUCTION IN THE PRACTICE AND THEORY OF NAVIGATION---Earl of Dunraven. Two volumes. $7.

SHIP BUILDING---Tables for constructing ship's lines. Second edition. Archibald Hogg. $2.

SIMPLE ELEMENTS OF NAVIGATION---Young. New second edition, $2.

STABILITY OF SHIPS--Sir E. J. Reed. $8.40.

STEEL SHIPS: Their Construction and Maintenance. A manual for ship builders, ship supsuperintendents, students and marine engineers. Thos. Walton. $5.50.

TEXT BOOK OF NAVAL ARCHITECTURE---J. J. Welch. $1.50.

TEXT BOOK OF SEAMANSHIP---Com. S. B. Luce, U. S. N. Equipping and handling of vessels under sail or steam. $10.

THEORETICAL NAVAL ARCHITECTURE: A treatise on the calculation involved in naval design. Samuel J. P. Thearle. In two volumes. $3.50.

THEORETICAL NAVAL ARCHITECTURE—E. L. Attwood. Text book: 114 diagrams. $2.50.

"WRINKLES" IN PRACTICAL NAVIGATION. Ninth edition, revised. S. T. S. Lecky. $8.40.

Books on Marine Engineering, or the Operation of Engines, and for Beginners in the Engine Room.

AMERICAN MARINE ENGINEER---By Edwards. $2.50.

ARITHMETIC OF THE STEAM ENGINE---E. S. Gould. $1.

ELECTRIC LIGHTING---Atkinson. $1.50.

ELECTRIC LIGHTING FOR MARINE ENGINEERS or how to light a ship by the electric light and how to keep the apparatus in order. S. F. Walker. $2.

ENGINEER'S EPITOME—N. J. Smith. A collection of figures, facts and formulae for engineers. 50 cents.

ENGINEER'S MANUAL OF LOCAL MARINE BOARD EXAMINATIONS---By Ainsley. $5.

ENGINES AND ENGINE RUNNING--Joshua Rose. For the use of those who desire to pass an examination to take charge of an engine or boiler; illustrated. $2.50.

EXAMINATION QUESTIONS AND ANSWERS--- Emory Edwards. 900 examination questions nad answers for young engineers and firemen who desire to obtain marine licenses. $1.50.

GAS, GASOLINE AND OIL ENGINES. Gardner D. Hiscox. $2.50.

HAWKINS' AIDS TO ENGINEERS' EXAMINATIONS, with Questions and Answers. $2.

HAWKINS' SELF-HELP, Mechanical Drawing. $2.

HAWKINS' NEW CATECHISM OF ELECTRICITY. $2.

HAWKINS' MAXIMS AND INSTRUCTIONS FOR THE BOILER ROOM. Useful to the engineer, the fireman, to the steam user or owner, and to the student of steam engineering. $2.

HAWKINS' HAND BOOK OF CALCULATIONS FOR ENGINEERS. Comprises elements of arithmetic, mensuration, geometry, mechanical philosophy, with explanations and help rules useful to an engineer. $2.

HAWKINS' NEW CATECHISM OF THE STEAM ENGINE. $2.

HAWKINS' INDICATOR CATECHISM (A practical treatise). $1.

HOW TO RUN ENGINES AND BOILERS. Practical instruction for young engineers and steam users. E. P. Watson. New fifth edition. $1.

INDICATOR PRACTICE----Hemenway. $2.

KEY TO ENGINEERING—Invaluable to engineers and firemen about to take examinations. Written in the plainest language and in the form of questions and answers. Postpaid, 75 cents.

KEY TO ENGINES AND ENGINE RUNNING--- Joshua Rose. For use of those desiring to pass examination to take charge of an engine or boiler. $2.50.

LESSONS AND PRACTICAL NOTES ON STEAM, THE STEAM ENGINE, PROPELLERS, ETC.— King. $2.

LIBRARY OF STEAM ENGINEERING---John Fehrenbatch, M. E. $5.

MARINE BOILERS: A treatise on the Causes and Prevention of their Priming, with remarks on their general management. Reed. $2.

MARINE BOILERS—Stromeyer. $5.

MARINE BOILERS---L. E. Bertin. 250 illustrations, designs and tables. $7.50.

MARINE ENGINES---R. Murray. $1.80.

MARINE PROPELLERS---By Barnaby. $4.50.

MARINE STEAM ENGINE: Its Construction, Action and Management—Carl. Busley. A manual and book of reference for engineers, students, ship owners, officers of the navy and mercantile marine, and all interested in steam navigation. Thoroughly revised; third edition, $15.00.

MARINE STEAM ENGINES—Sennet & Oram $6

MECHANICS' AND ENGINEERS' POCKET BOOK, including Naval Architecture, Steam and the Steam Engine, Steam Vessels, etc. 64th edition, 1050 pages. Chas. H. Haswell. $4.

MECHANICAL ENGINEERS' POCKET BOOK--- Wm. Kent. Reference book or rules, tables, etc. $5.

MODERN EXAMINATIONS OF STEAM ENGINEERS---W. H. Wakeman. $1.50.

NAUTICAL ENCYCLOPEDIA, ILLUSTRATED--- Howard Patterson. Complete from Standpoint of Marine Engineer and Naval Architect. $3.

POCKET BOOK OF MARINE ENGINEERING, RULES AND TABLES---Seaton and Rounth waite. For marine engineers, naval architects, sperintendents and others engaged in construction of marine machinery. $3.

PRACTICAL MARINE ENGINEERING, for marine engineers and students with aids for applicants for marine engineers' licenses. Prof. W. F. Durand. $5.00.

QUESTIONS AND ANSWERS FOR MARINE ENGINEERS—Theo. Lucas. Containing 807 questions, with fully explained illustrated answers. $2.

QUESTIONS AND ANSWERS, sixth edition---Stephen Roper. $2.

REED'S ENGINEERS' HAND BOOK---New Edition; illustrated by 345 diagrams and 36 large plates. $5.

REED'S KEY to Reed's Hand Book---Contains working of all questions given in examination papers. $3.

RESISTANCE AND PROPULSION OF SHIPS---W. F. Durand, principal of school of marine construction. Cornell University. $5.

ROPER'S ENGINEERS' HANDY BOOK for Steam Engineers and Electricians. Revised and enlarged. $3.50.

SCREW PROPELLERS AND MARINE PROPULSION---I. McKim Chase. $2.50.

SLIDE VALVE—Julius Begtrup. Special reference to Modern Practice in the United States. $2.

SLIDE VALVE, SIMPLY EXPLAINED—W. J. Tennant. $1.00.

SLIDE VALVES---C. W. MacCord, Jr. A book for practical men on the principles and methods of design. $1.50.

SMALL ENGINES AND BOILERS—Egbert P. Watson. A manual of concise and specific directions for construction of small steam engines and boilers of modern types; illustrated $1.25.

STEAM AND THE MARINE STEAM ENGINE— Jno. Yeo. $2.50.

STEAM BOILERS---Joshua Rose. Practical treatise construction and examination. Seventy-three engravings. $2.50.

STEAM BOILER: Its Care and Management. Stephen Roper. $2.

STEAM ENGINE: Theory and Practice---Ripper. $2.50.

TRIPLE AND QUADRUPLE EXPANSION ENGINES AND BOILERS AND THEIR MANAGEMENT---A. Ritchie Leask. Third edition, revised. $2.

WATER TUBE BOILERS---Fifth revised and enlarged edition of HOW TO RUN ENGINES AND BOILERS---F. P. Watson. Practical instruction for young engineers and steam users. $1.

Sent to any address, carriage prepaid, at prices named.

The Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland, Ohio.

The Cleveland Trust Company

A safe depository for the surplus funds of firms, corporations and individuals.

4% on Savings Deposits.

CAPITAL and SURPLUS - $2,800,000.00
DEPOSITS - - - $15,000,000.00

NO 1 EUCLID AVE · NO 121 EUCLID AVE

4 PER CENT ON SAVINGS.

THE FEDERAL TRUST CO.
CLEVELAND.

CAPITAL $1,500,000.

(Surplus and Undivided Profits Earned $152,000.)
Pays Interest on Check Accounts.
Acts in Any Trust Capacity.
Superior, Corner Water Street.

FAHEY & CO. Bankers & Brokers.
TELEPHONE, MAIN 2754.
1011-1015 THE WILLIAMSON BLDG. CLEVELAND, O.
EVERY POSSIBLE FACILITY FOR CONDUCTING A BROKERAGE BUSINESS IN STOCKS, BONDS, GRAIN, ETC.

NEW HARBOR CHARTS OF THE LAKES.

Following is a list of harbor charts recently issued from the United States Lake Survey Office, all in colors: Duluth and Superior Harbors, Two Harbors, Ashland, Marquette, Milwaukee, Chicago, Muskegon, Toledo, Sandusky, Cleveland, Lorain, Fairport, Ashtabula, Conneaut, Erie, Dunkirk and Buffalo.

For sale by THE MARINE REVIEW PUB. CO.,
39-41 WADE BUILDING, CLEVELAND, O.

The Sterling & Welch Company

Have furnished for the past five years all the **Floor Coverings** and **Door** and **Window Draperies** for the steamers built by the **American Ship Building Co.** We make a specialty of Boat Furnishings and show a very large assortment of Carpets, Rugs, Draperies, etc., etc.

12 and 14 Euclid Avenue. - - Cleveland, Ohio

The Williams & Rodgers Company,

Superior and Seneca Sts., CLEVELAND, O.

WE MAKE A SPECIALTY OF FITTING OUT BOATS.

Carpets, Rugs, Furniture, Curtains, Bedding,

And all other Furnishings used in Cabins.

SPECIAL RATES TO THE MARINE TRADE.

Bring your Boat wants and your family wants to this store, and we'll take the very best care of you. Dry Goods, House-furnishings, Carpets, Furniture, and all other articles found in a first-class Dry Goods House.

THE WILLIAMS & RODGERS COMPANY, Cleveland, O.

TEXT BOOK OF
NAVAL ARCHITECTURE,
BY J. J. WELCH.
$1.50.
MARINE REVIEW PUB. CO., - - CLEVELAND.

WEEKLY. ILLUSTRATED. PRICE 6D.

"THE SHIPPING WORLD"

Written by Experts *Illustrated by Artists*

ANNUAL SUBSCRIPTION, UNITED KINGDOM $5.11
OTHER COUNTRIES - - - - $6.82

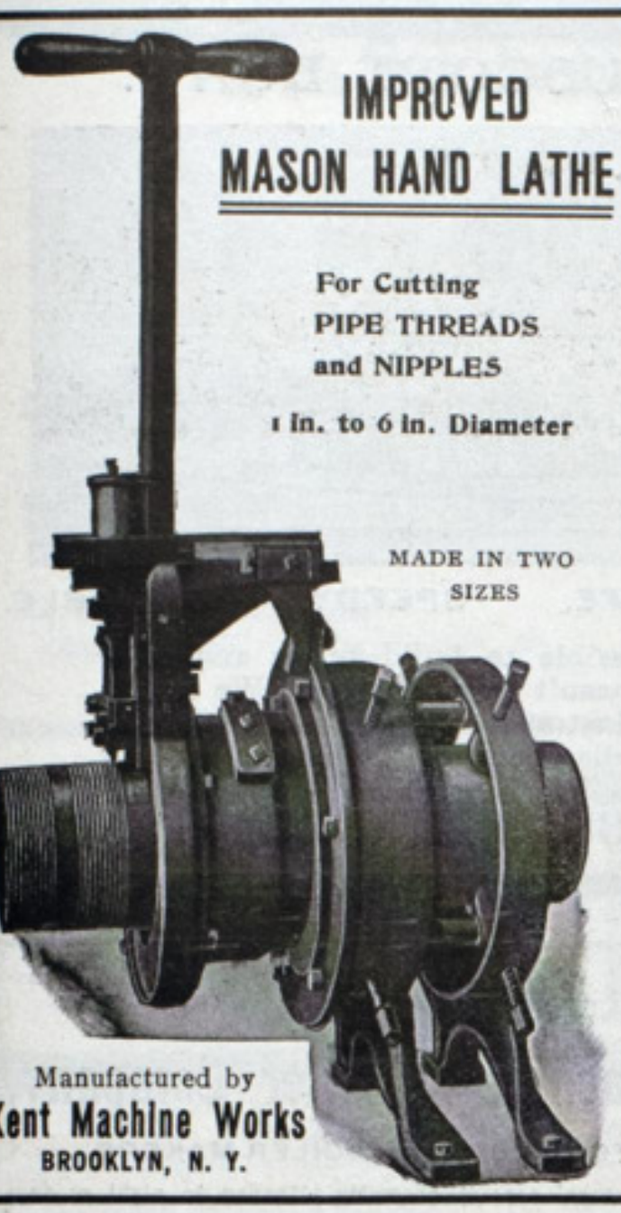
Contains the best and most informing illustrated literature regarding

Naval Architecture
Marine Engineering
Commercial & Shipping
Questions of the Day

The Shipping World Ld.

Effingham House, Arundel Street, Strand,
LONDON, ENGLAND.

Subscriptions and advertisements for The Shipping World accepted at The Marine Review offices.



IMPROVED
MASON HAND LATHE

For Cutting
PIPE THREADS
and NIPPLES

1 in. to 6 in. Diameter

MADE IN TWO SIZES

Manufactured by
Kent Machine Works
BROOKLYN, N. Y.

COMPASS ADJUSTER

CAPT. J. M. FIELDS
Inventor of and Agent for
Fields' Patent Course Finder

Bethel Hotel - Cleveland, Ohio

ORAM FIX. ESTABLISHED 1860. J. W. FIX.

S. FIX'S SONS,

Successors to S. FIX & SON,

Steam Flue Welding Works

Our Work Stands Government Test.
Our Welds are Perfectly Smooth.
Write us for Prices.

COR. LEONARD AND WINTER STS. Cleveland, O.

MACHINERY New and Second Hand ENGINES, BOILERS, MACHINE TOOLS, CONTRACTORS' MACHINERY

Geo. H. BOWLER & CO.

507-508 WILLIAMSON BUILDING. CLEVELAND, OHIO

Warehouses 20-22 Frankfort St. 59-61 So. Water Street. Cleveland Terminal & Valley Railway.

DOWNING METALLIC PACKING
Sold Under 5 Years' Guarantee
WRITE FOR CATALOGUE
THE N. L. HAYDEN MFG. CO.
COLUMBUS, OHIO

EIGHTH REVISED EDITION.

Scott's Coast Pilot for 1903.

Great Lakes and Connecting Waters,

At $1.50.

For sale by MARINE REVIEW PUB. CO.

Photographs of Lake Vessels.

Unless otherwise specified, negative size of following Photographs is 7x9 inches, and price is 75 cents each. Postage paid.

Alva.
Angeline, Hold. (Size 10x13—Price $1.25).
Angeline, Spar Dock. (Size 10x13—Price $1.25).
Argyle. (Thousand Islands).
Argyle. (Thousand Islands).
James Battle. (Detroit Fire Boat). On the ways.
James Battle. (Detroit Fire Boat). The launch.
Castalin.
Chicora.
Chippawa.
City of Bangor.
City of Erie at Buffalo Docks.
City of Erie.
Columbia. (On the Ways—Three Views).
Conemaugh.
Coralia, loading at Escanaba Ore Dock. (Size 17x21—Price $2.00).
Corsica.
Corona.
John Craig.
M. M. Drake.
Eastern States. (Launch).
Eastern States on First Trip. (Three Views).
Eastern States. (On the Ways—Three Views).
Isaac L. Ellwood.
Excelsior. (Detroit Ferry).
H. C. Frick.
Garland. (Detroit Ferry).
Harlem.
Harvard. (On the Ways).
Harvard. (The Launch).
Harvard. (In the Slip—Two Views).
Helena.
Hennepin.
Islander. (Thousand Islands—Two Views).
Frank E. Kirby at Put-in-Bay.
Lackawanna.
Mahoning.
Hahoning.
Michigan Central in Detroit River. (Winter).
Mohawk.
Montana.
W. B. Morley, wreck in Detroit River, Aug. 6, 1899.
Simon J. Murphy. (On the Ways).
Simon J. Murphy. (On the Ways—Two Views).
Simon J. Murphy, Launch. (Bow in Slip, Stern not yet in Water).
Neshoto.
New Island Wanderer. (Thousand Islands).
New York. (Thousand Islands—Two Views).
North King. (Thousand Islands).
North Land, in the "Soo" Locks. (Two Views).
North Land, at Mackinac Island. (Two Views).
North Land and North West in Winter Quarters.
Ongiara. (Two Views).
Peerless, at Mackinac Island.
Pere Marquette No. 17.
Pleasure, at Dock (Detroit Ferry).
E. C. Pope.
Princeton.
Ramapo.
W. D. Rees.
St. Lawrence (Thousand Islands).
Ste. Marie, in Mackinac Straits.
Howard L. Shaw. (On the Ways—Three Views).
Howard L. Shaw. (The Launch).
Howard L. Shaw. (In the Slip).
Sir William Siemens.
George Stone.
Tashmoo. (In Dewey Naval Parade, Detroit River).
Tashmoo, June 9, 1900.
Tashmoo. (Entering St. Clair Flats Ship Canal).
Tashmoo. (Landing at Star Island.—Two Views).
Toronto. (Thousand Islands).
Toronto. (Thousand Islands—at Alexandria Bay).
Toronto. (Thousand Islands—at Gananoque).
Transport, in Detroit River, Winter. (Car Ferry—Two Views).
Troy.
United Empire.
Capt. Visger. (Thousand Islands).
E. P. Wilbur.
Western States. (Size 10x13—Price $1.25).

ORDER FROM

Address: MARINE REVIEW PUB. CO.,
39-41 Wade Bldg., Cleveland, Ohio.

Schooner for Sale.

Schooner carrying 150 M. ft. of lumber or 90 cords of maple wood. Will be sold cheap for cash. For full particulars, address Box 37, Marine Review Pub. Co., Cleveland, O. tf

Salesman Wanted.

An article for every boat. Not new. Saves money while improving service. Large profits. Address Box 40, Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland, O. tf

Steamer and Tow Barge for Sale.

For Sale—Canadian steamer Orion, class A-2. Capacity 30,000 bushels of wheat or 500 M ft. of lumber or 900 tons coal.

Canadian tow barge Muskoka, A-2. Capacity 30,000 bushels wheat, or 600 M ft. of lumber, or 900 tons coal.

For particulars apply to Collins Bay Rafting & Forwarding Co., Ltd., Kingston, Ont. June 18.

Scotch Marine Boiler for Sale.

Scotch Marine Boiler for sale. Size, 10 ft. by 78 in.; triple riveted; 5/8 steel plate; dome 56 in. by 24 in.; two 4-in. and one 6-in. inlet in the dome; ninety-eight 3-in. tubes; stays 5/8 center; allowed 169 lbs. steam pressure to the square inch. Boiler as good as new. Located at Detroit, Mich. For price address Isaac Applebaum, 38-40 Randolph street, Detroit, Mich. t.f.

For Sale or Charter.

Large, side-wheel passenger steamer, allowed by Government inspection to carry 800 passengers. Excellent equipment; large dining room; electric lights and searchlight, etc. For full information apply to Howard S. Folger, Kingston, Ont., Canada. Apr. 23.

Steamer For Sale.

For sale at a bargain, steamer Cambria, a-Canadian boat, 206 ft. long and 40 ft. beam, fitted with feather dip paddles, electric lighting plant; fully equipped with all sailing appliances; used for both passenger and freight purposes. Will sell for $3,000.00 Address, Frank Lenahan & Son, 53 Fulton St., Buffalo, N. Y. tf.

Steamer for Sale.

Steamer T. D. Stimson for sale. Capacity 550,000 ft. lumber. Rates A-2; fully rebuilt two years ago. Will take smaller steamer part payment. Address A. B. Slyfield, owner, Port Huron, Mich. tf

Passenger Steamer and Tug for Sale.

Steamer Ogantz, 80 ft. keel, 18 ft. 8 in. beam, 7 ft. 6 in. draught. Fore and aft compound engine, 14 and 25 by 16 in. Scotch boiler, 10 ft. by 84 in., allowed 125 lbs. steam. Passenger allowance—45 regular and 190 excursion.

Tug Dan Connelley, 65 ft. keel, 16 ft. 6 in. beam. 8 ft. 6 in. draught. Iron boiler 13½ ft. by 76 in., allowed 90 lbs. steam. Double engine, 14x15 in.

These boats were in commission last season and are in good condition. Price reasonable. For particulars address The Sandusky Fish Co., Sandusky, O. tf

FOR SALE.
STEAMBOAT ENGINES.

Two pair 7 x 9 double cylinder vertical reversible **steam engines** of the Crane elevator engine style. Send for blue print, photos and price. Also **pumps, condensers** and **small engines for electric lights.**

CLYDE MACHINE WORKS
33d St. and Shields Ave. - Chicago, Ill.



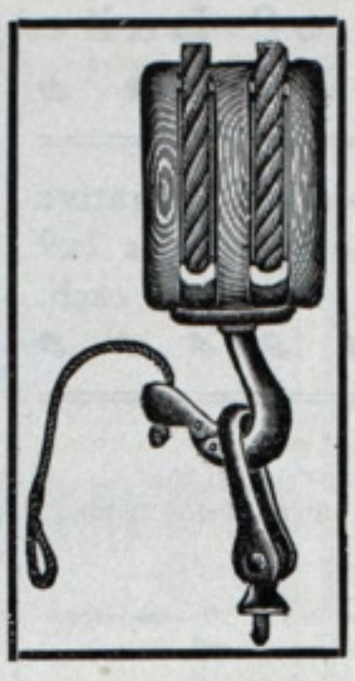
Standard Automatic Releasing Device.

The Falls are so rove that both ends of the boat detach, irrespective of which end strikes the water first

Will release a boat immediately in the roughest sea or under speed and can be hooked on without delay or injury to the hands of men hooking it on.

Standard Automatic Releasing Hook Co..

New Cheesebrough Bldg.
17 State St., New York.



Fogg's Resilent Felt Matresses and Cushions.

Manufactured By.

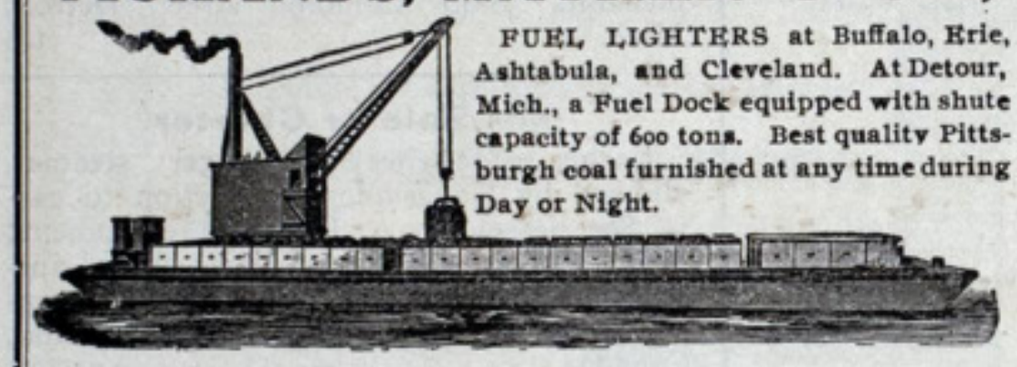
M. W. FOGG,

202 Front St. N. Y.

Send for Illustrated Catalogue.



PICKANDS, MATHER & CO.,



FUEL LIGHTERS at Buffalo, Erie, Ashtabula, and Cleveland. At Detour, Mich., a Fuel Dock equipped with shute capacity of 600 tons. Best quality Pittsburgh coal furnished at any time during Day or Night.

Western Reserve Building, CLEVELAND, O.

Just from the Press

Most Valuable Little Book ever issued by The Marine Review

Send for it on Approval.

A set of tables showing the time required at different rates of speed, 8 to 15 miles an hour, to cover distances between all ports on the Great Lakes. A time-saver to the vessel owner or vessel agent as well as captain or engineer.

Everything at a Glance

Examination of it for the Asking.

Price $1.00

THE MARINE REVIEW PUB. CO.
Wade Building, Cleveland.

A TRUSCOTT BOAT.



SIMPLE. SAFE. SPEEDY. RELIABLE.

It may be possible to build better and safer boats, but it hasn't been done yet. We send a completely illustrated catalogue and price list free, which tells you all about boats and why Truscott Boats Excel.

TRUSCOTT BOAT MFG CO. ST. JOSEPH, MICH.

J. B. COWLE, Pres. W. E. PERKINS, Sec'y and Treas.
MAT. THOMAS, Gen'l Mgr.

The Union Machine & Boiler Company,

MACHINISTS, FOUNDERS AND BOILER MAKERS.

Jobbing solicited. Steel vessel repairs promptly attended to night or day.

108 TO 114 RIVER STREET. CLEVELAND, O.

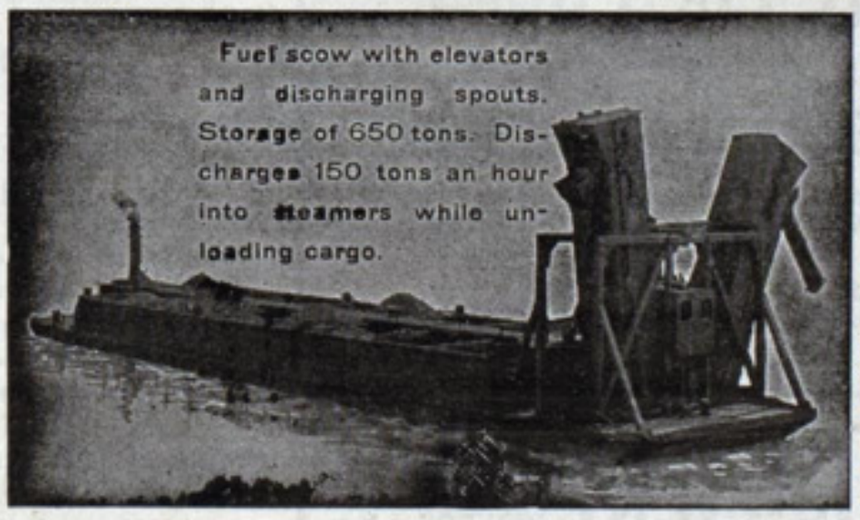
Phones: Bell Main 609. Cuy. A. 711. Night Call Cuy. M. 1843.

ABRAM SMITH & SON,
ALGONAC, MICH.

Wooden Ship Building and Rebuilding.

Before placing your work we will be pleased with an opportunity to quote YOU our prices.

Steamboat Fuel at Ashtabula. Large Supplies of best Quality.



LIGHTER Carrying Different Grades at all Times.

M. A. HANNA & CO. Miners and Shippers, Main Office Perry-Payne Bdg. Clevl d.

The Graham Coal & Coke Company, Ltd.

1008-9 Chamber of Commerce

WHOLESALE

COAL AND COKE

Exceptional facilities for Supplying Vessels.
Steamboat fueling pockets at foot of 21st Street.

Detroit, Mich.

Dock Phone Mich. W 266

CASTNER, CURRAN & BULLITT,

SOLE AGENTS FOR

C. C. B. POCAHONTAS SMOKELESS SEMI-BITUMINOUS **COAL**

C.C.B. POCAHONTAS COAL — Trade Mark Registered

THE BEST STEAM COAL IN THE WORLD.

Officially endorsed by Great Britain and United States. Standard Fuel of United States Navy. For ten years used exclusively on Cunard, White Star and other Transatlantic Lines.

Main Office, Arcade Bldg., 1 S. 15th St., PHILADELPHIA, PA.

BRANCH OFFICES:

1 Broadway, New York.
Citizens' Bank Building, Norfolk, Va.
Old Colony Building, Chicago, Ill.
70 Kilby Street, Boston, Mass.
4 Fenchurch Avenue, London, England.
Terry Building, Roanoke, Virginia.
Neave Building, Cincinnati, Ohio.

PITTSBURG COAL COMPANY.

Steamboat Fueling Facilities at Various Points on the Great Lakes:

CLEVELAND HARBOR { 4 Car Dumpers. 3 Lighters.
FAIRPORT HARBOR { 1 Car Dumper. 1 Lighter.
ASHTABULA HARBOR { 1 Car Dumper. 1 Lighter.
ERIE HARBOR { 1 Car Dumper. Fuel Pockets.
DETROIT RIVER BRANCH { Docks and Pockets at Sandwich and Amherstburg.
SAULT RIVER BRANCHES { Dock and Pockets at Detour. Dock and Pockets at Sault Ste. Marie. (The Port Royal Dock Co.)

WE FURNISH ONLY THE BEST GRADE OF **Pittsburg and Youghiogheny Coal.**

GENERAL OFFICE, LAKE DEPARTMENT, PERRY-PAYNE BUILDING, CLEVELAND, OHIO.

STEAMBOAT FUEL AT CHICAGO. • • •

THE Y&L

Youghiogheny and Lehigh Coal Company.

J. T. CONNERY, Manager — ARCHIE J HITCHCOCK, Dock Sup't.

Main Office: 902-906 Fisher Bldg.,

277 DEARBORN STREET.

FUEL DOCKS.

No. 1, Michigan Slip and Basin, - - 'Phone Har. 4156.
No. 2, North Halsted Street Bridge, - 'Phone Har. 4157.
No. 3, Foot South Water St. and Illinois Central Slip C. 'Phone Har. 4158.

FUEL LIGHTER.

Equipped with 125 2-ton Buckets for Fueling Anywhere in Harbor.

Long Distance Telephone, Har. 4156.

The Rochester & Pittsburgh Coal & Iron Co.—Steamboat Fuel Dock—Blackwell Canal at Michigan St. Bridge. 1400 feet of dock frontage. Hulett Car Dumping Machine. Steam Fuel Scow of 550 tons capacity. Boats coaled day or night. Office: 684-88 Ellicott Sq. Buffalo, N. Y. Telephone, Seneca 1154.

E. McQ. Duthie, Cargo and Fuel Agent.

REYNOLDSVILLE COAL.



STANLEY B. SMITH & CO.

DETROIT, MICH. **COAL** TOLEDO, OHIO.

SMITH'S COAL DOCK DETROIT RIVER — 12 POCKETS PLATFORM LOW DOCK

TOLEDO HARBOR — 2 LIGHTERS 2 DERRICKS (REVOLVING) 2 LOW DOCKS

SHIPPERS OF COAL BY RAIL AND LAKE.

A COMPLETE SET OF CHARTS OF THE GREAT LAKES

ELEVEN IN ALL.

(Edges bound with Tape to Prevent Tearing.)

Sent to any Address, Carriage Prepaid, for $5.45.

THE MARINE REVIEW PUB. CO., 39-41 WADE BUILDING, CLEVELAND, OHIO.

VESSEL AND INSURANCE AGENTS.

T. R. McCARTHY,

STEAMSHIP and FREIGHT BROKER.

Chartering, Forwarding and General Commission Agent; and Broker for the Sale, Purchase and Construction of Steamers and Sailing Vessels.

Marine and Fire Insurance Effected.

Cable address: "MACARTHY, MONTREAL."

(Watkins', Scott's, Lieber's and A. B. C. Codes used.)

Shipping Agent to THE ASBESTOS & ASBESTIC CO., Ltd., of Danville, Que.

6 St. Sacrament St. - - - - - - - - Montreal, Can.

Correspondence invited and Agencies Solicited.

P. H. FLEMING & CO.

INSURANCE and VESSEL AGENTS

MARINE, FIRE, OCEAN, LIABILITY.

Telephone Harrison 1359

No. 2 Sherman Street - - CHICAGO, ILL.

C. W. Elphicke. H. B. Earhart.

C. W ELPHICKE & CO.,

VESSEL AND INSURANCE AGENTS,

Rooms 9-11, No. 6 Sherman St., CHICAGO, ILL.

Long Distance Telephone, Harrison 1194.

W. A. Hawgood. Arthur H. Hawgood.

W. A. HAWGOOD & CO.,

VESSEL and INSURANCE AGENTS.

220-221 Perry-Payne Bldg., - - - CLEVELAND, O.

Long Distance Telephone, Main 2395.
Residence Telephone, W. A. Hawgood, Doan 84-J.
Residence Telephone, Arthur H. Hawgood, Doan 841-J

John Mitchell. John F. Wedow. Alfred Mitchell.

MITCHELL & CO.,

VESSEL and INSURANCE AGENTS,
508, 509 & 510 Perry-Payne Bldg.

Office Telephone, M 767. Residence, John Mitchell, Doan, 341. John F. Wedow, Doan, 141-J.
Alfred Mitchell, Doan, 218.

CLEVELAND, - - - - - - - - - - - OHIO.

C. L. Hutchinson. W. H. McGean.

HUTCHINSON & CO.,

VESSEL and INSURANCE AGENTS,

Office Telephone, Main 2453.
Residence, C. L. Hutchinson, Ridge 345-L.
Residence, W. H. McGean, East 1421-J.
313-315 Perry-Payne Bldg., - - CLEVELAND, O.

W. C. RICHARDSON,

VESSEL OWNER and BROKER
and
MARINE INSURANCE AGENT,

420-421 Perry-Payne Bldg. - - CLEVELAND, O.
Office Telephone 338; Residence Telephone, 2938.

D. Sullivan. F. J. Sullivan.

D. SULLIVAN & CO.

VESSEL AGENTS.
MARINE INSURANCE.

2-4 Sherman Street, - - - - - CHICAGO, ILL.
Office Tel., Harrison 2847; Residence, Ashland 2483.

R. J. DUNHAM,

VESSEL AGENT. MARINE INSURANCE.

214 Sherman Street, - - - - CHICAGO, ILL.

TELEPHONES:
Office, Harrison, 2630; Residence, Dearborn, 671.

John B. Hall. Harry B. Root.

HALL & ROOT,

VESSEL AGENTS.

21-22 Exchange Bldg, 202 Main Street.,
Telephone, Seneca, 892. BUFFALO, N. Y.

W. W. BROWN.

Member Cleveland Stock Exchange.

Buys and Sells all Kinds of Vessel Property.

1105-1106 Williamson Bldg., - - CLEVELAND, O.

JOHN J. BOLAND,

VESSEL and INSURANCE AGENT.

25-26 Exchange Building, 202 Main St.
Telephone, Seneca, 115. BUFFALO, N. Y.

VESSEL AND INSURANCE AGENTS.

J. J. H. Brown. J. B. Rodgers. Edward Smith.

BROWN & CO.,

VESSEL and INSURANCE AGENTS,
202 Main Street, - - - - - - BUFFALO, N. Y.

D. T. HELM & CO.

VESSEL and INSURANCE AGENTS.

Telephones—Office, 263
Res. 381-3.

DULUTH, - - - - - - - - - - MINN.

SAMUEL HOLMES,

STEAMSHIP OFFICES, Morris Building.
66-68 Broad St.,

For Selling, Chartering and Building all Classes Steam Vessels.

Steam Vessel Circulars.
Weekly Freight Circulars. NEW YORK.

RUFUS S. KING,

Commission Merchant and Broker

MARITIME BUILDING, 6-10 BRIDGE ST.,
Near Battery Park, NEW YORK.

Has the Largest List of Steamships and Sailing Vessels for Sale in America, Consequently Most Bargains.

Buying, Selling and Building of Steamships, Ships, Yachts, Tugs, Steam Lighters, Schooners, Barges, etc.

Expert on Valuation of Steam and Sailing Vessels.

CABLE ADDRESS, "RUFUS," WATKINS' CODE.
TELEPHONE, 3404 BROAD.

F. H. WEEKS,

MARINE BROKER,

Vessels Sold, Chartered, Built and Insured.
Cable Address, WEEKSHIP, New York.

Telephone, 3275 Broad. 32 Broadway, New York.

Charles P. Notman. David H. E. Jones.

JAMES W. ELWELL & CO.,

Established 1830.

SHIP BROKERS and STEAMSHIP AGENTS.
Sell and Charter all Classes of Vessels.

Agents for Cyprien Fabre & Cie. S. S. Line, Cie. Havraise Peninsulaire, and Northwestern S. S. Co.

Battery Park Bldg., 21-24 State St. NEW YORK.

PROCTORS IN ADMIRALTY.

McPherson, Clark, Campbell & Jarvis,

Barristers-at-Law, Attorneys, Proctors in Admiralty.
(Trust and Guaranty Building)

16 King St. West, - - - TORONTO, CANADA.

ADMIRALTY AND MINING.

Telegraphic Address, "Clapher-Toronto."
(W. D. McPherson and J. M. Clark authors of "The Law of Mines in Canada.")

RAY G. MacDONALD,

Attorney-at-Law and Proctor in Admiralty.

Suite 618 New York Life Building,

Telephone, Central 723. CHICAGO, ILL.

SHAW, WARREN, CADY & OAKES,

Attorneys-at-Law,

904 to 907 Union Trust Bldg.,..

Telephone, 685. DETROIT, MICH.

C. E. KREMER,

Counsellor at Law and
Proctor in Admiralty.

Suite 821-822 - - - - New York Life Building.

CHICAGO - - ILL.

PROCTOR IN ADMIRALTY.

EDWARD GASKIN,

SHIP BUILDING EXPERT.

Plans and Specifications for Ships, Surveys and Estimates, superintendence, etc.

Ellicott Square, - - - - - BUFFALO, N. Y.

HARVEY L. BROWN,

PROCTOR IN ADMIRALTY.

35 White Building, - - - - - BUFFALO, N. Y.

HOYT, DUSTIN & KELLEY,

LAWYERS AND PROCTORS IN ADMIRALTY.

Offices, 702 Western Reserve Building,

CLEVELAND, - - - - - - - - - OHIO.

White, Johnson, McCaslin & Cannon,

ATTORNEYS-AT-LAW and
PROCTORS IN ADMIRALTY.

Williamson Building, - - - - CLEVELAND, O.

GOULDER, HOLDING & MASTEN,

LAW OFFICES,

Harvey D. Goulder, S. H. Holding, Frank S. Masten.

Perry-Payne Building, - - - CLEVELAND, O.

ALBERT J. GILCHRIST,

PROCTOR IN ADMIRALTY.

604 Perry-Payne Building, - - - CLEVELAND, O.

O. C. Pinney. Dorr E. Warner.

PINNEY & WARNER,

LAWYERS AND PROCTORS IN ADMIRALTY.

Rooms 316 and 317 Perry-Payne Building.

Telephone, Main 2585 - - - - CLEVELAND, O.

H. R. SPENCER,

MARINE LAW,

BOARD OF TRADE BUILDING,

DULUTH, - - - - - - - - - MINN.

PROFESSIONAL.

W. J. WOOD, NAVAL ARCHITECT, Consulting Engineer.

Prepares designs or working drawings and specifications for all classes of vessels and superintends construction and repairs. Surveys damaged property and estimates cost of repairs. Arbitrator and court expert.

Vessels designed—Twin S. S. Virginia, U. S. S. Frolic, formerly steam yacht Comanche, Twin S. S. North West and North Land, I. W. Nicholas, and many others, including Fire Boats, Tugs, Barges, etc.

Complete Plans Furnished For
Steel Composite or Wooden Vessels.

709 Rialto Building - - - - - - CHICAGO.
Tel. Harrison 1020.

R. L. NEWMAN, Consulting Engineer, Naval Architect.

SHIP AND YACHT BROKER.

Attention to development of designs and superintendence during construction. Vessels for carrying oil in bulk a specialty; also surveys on general repairs. Oil fuel systems for marine and land purposes developed under the patents of the International Oil Fuel Construction Company of New York.

817 Chesebrough Bldg., Bowling Green,
NEW YORK.

JOSEPH KIDD,

Marine Architect and Surveyor. Consulting Ship Builder and Engineer.

Over thirty years' experience. Specifications, Designs and Estimates, Superintendence of Construction and Repairs. Damage and Other Surveys carefully attended to. Negotiations for the building, charter or sale of all kinds of vessels and machinery.

610 Board of Trade, - - - - DULUTH, MINN.

PROFESSIONAL

AMBROSE V. POWELL, M. Am. Soc. C.E.

CIVIL ENGINEER,
Designs and Constructs Dry Docks, Harbor Works, Docks and Plant for Handling Coal and Ore, Foundations.
Office, 1008 Chamber of Commerce, CHICAGO, ILL.

Members Maritime Association Port of N. Y.

SADLER, PERKINS & FIELD

Naval Architects and Engineers.
Chartering and Brokerage.
Maritime Building, New York.
NEW YORK. DETROIT.

ROBERT LOGAN,

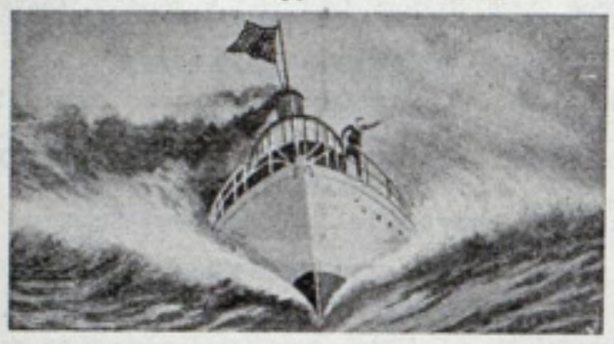
Marine Architect, Mechanical Draughtsman, Consulting Engineer.

Specifications and designs for all descriptions of Marine Vessels, Engines and Boilers, Superintends Construction and Repairs. Damage and other Surveys carefully attended to.

810 Western Reserve Bldg. CLEVELAND, O.

CHARLES D. MOSHER,

NAVAL ARCHITECT AND ENGINEER,
No. 1 Broadway, NEW YORK.



THE FASTEST YACHTS IN THE WORLD.

Arrow, 45.06 miles per hr. Ellide, 40.2 miles per hr. Feissen, 31.6 miles per hr. Norwood, 30.5 miles per hr. Presto, 31 miles per hr. Yankee Doodle, 29.5 miles.

The Mosher Patent Triple and Quadruple Expansion Engines and Water-tube Boilers. These boilers have been supplied for no less than eleven of the torpedo boats of the U. S. Navy, the U. S. Monitor, Florida and six torpedo boats for Russian government, besides for numerous other fast yachts and launches. Most powerful, lightest and compact boiler made.

Pittsburgh Testing Laboratory, Ltd.,

INSPECTING AND METALLURGICAL ENGINEERS AND CHEMISTS,
1750 Monadnock, CHICAGO. 235 Water Street, PITTSBURG,
906-7 Crozier Building, Philadelphia,
New York City, 60 New Street.
Richmond, Va., 1107 1-2 Main St.
Inspectors of Shipbuilding Materials and Machinery. Inspectors located at all mills. Physical and Chemical Laboratories. Tests of all kinds.

ROBERT W. HUNT & CO.

BUREAU OF INSPECTION.
TESTS AND CONSULTATION.
1121 The Rookery, Chicago.
Monong. Bank Bldg., Pittsburg.
71 Broadway, New York.
Inspectors of Shipbuilding Material and Machinery. Inspectors of all Materials. Duty Tests of Engines and Boilers. Physical and Chemical Laboratories.

Time and Distance Tables

FOR LAKE SHIPS

A set of tables showing the time required at different rates of speed, 8 to 15 miles an hour, to cover distances between all ports on the Great Lakes. A time saver to the vessel owner or vessel agent, as well as captain or engineer. Send for it on approval.

Price, $1.00

MARINE REVIEW PUB. CO.
39-41 Wade Bldg., Cleveland, Ohio

PATENTS.

E. L. Thurston. Albert H. Bates.

THURSTON & BATES,

Counselors at Law in Patent Causes, and Solicitors of Patents,
1028 Society for Savings Bldg., - CLEVELAND, O.

SCHWENCKE, KIRK & CO.,

Importers and Manufacturers of

DRAWING MATERIALS.

26 Church St, NEW YORK,
Factory, HOBOKEN, N. J.

REED'S ENGINEERS' HAND-BOOK.

Seventh Edition.

Revised and Enlarged. Including set of plates and supplement containing New Elementary Questions and Answers.

Price $5.00

At office of

Marine Review Pub. Co.,
40 Wade Bldg., leveland, O.
By Express—45 Cents Extra.

HAWKINS' EDUCATIONAL WORKS

FOR UP-TO-DATE ENGINEERS

Consisting Of Seven Volumes On STEAM, ELECTRICAL ENGINEERING And MECHANICAL DRAWING. A Set Of Practical Books For Practical Men PRICE $12. Terms $1. Per Month. CATALOG FREE Sent On Request

THEO. AUDEL & Co. 63-5TH AV. NEW YORK

"Steel Ships

THEIR CONSTRUCTION AND MAINTENANCE."

A valuable work, just from the press, by THOMAS WALTON, Author of "Know Your Own Ship."

Not highly technical, but well suited to Ship Superintendents, Marine Engineers, and students of ship construction.

INTRODUCTION deals with steel from its crude state in ore to finished product in ship material. Then follows chapters dealing with principal structural features and alternative modes in which a vessel may be built. Largest section of the book treats in detail of the construction and combination generally of the various parts which go to make up the whole ship structure—framing, plating, stern frames and rudders, riveting, pumping and ventilation and includes also remarks upon launching

Price, $5.50.

THE MARINE REVIEW PUB. CO.
CLEVELAND, O.

Photographs of Marine Scenes on the Great Lakes.

Negative size of the following Photographs is 7x9 inches. Sent to any address, postpaid at 75 cents each.

ASHTABULA, OHIO.
Harbor Entrance.
L. S. & M. S. Ry. Ore Docks.
L. S. & M. S. Ry. Ore Docks—unloading ore.
L. S. & M. S. Ry. Ore Docks—ore on docks.
Car Dumping Machine, two views.
Fueling Lighter with Clam Shell Hoist.

BUFFALO, N. Y.
Harbor Entrance.
City Ship Canal.
Great Northern Elevator and Shipping.
Great Northern Elevator—unloading grain.
River and Elevators.
River and Elevators, foot of Michigan St.
River and Elevators, foot of Main St.
C. & B. Line Freight Sheds.
Northern Steamship Co.'s Winter Quarters.
"An Old Timer" at C. T. T. Elevator.
Lackawanna Coal Chutes, two views.
Lackawanna Ore Docks—unloading ore.
Lackawanna Ore Docks—unloading ore and loading coal.
Unloading Ore from Whaleback, two views.
Unloading Wheat into Elevators, two views.

CHICAGO, ILL.
Chicago River Elevators.
Lake Front, from Illinois Central Station.
Illinois Steel Works and Harbor Entrance, South Chicago.

CLEVELAND, O.
Cleveland Harbor from Lake View Park.
American Steel & Wire Co.'s Plant.
Ellsworth Coal Chutes-Dumping Car, two views
Cleveland & Pittsburg Ore Docks, two views.
Ore Docks and Harbor, two views.
Unloading Ore, two views.
Globe Iron Works Ship Yard.
Globe Iron Works Ship Yard, Laying Keel of No. 400.

CONNEAUT, O.
Harbor Entrance.
Unloading Ore—Brown Conveying Hoists, two views.
Unloading Ore—Clam Shell Plant.
Car Dumping Plant, two views.

DETROIT, MICH.
Winter in Detroit River.
Car Ferry turning in ice—two views.
"Michigan Central" entering slip.

DULUTH, MINN.
The Harbor.
The Bluffs.
"Last Trip From Duluth."

ERIE, PA.
Anchor Line Docks and Pennsylvania R. R. Co.'s Ore and Coal Docks.
Pennsylvania R. R. Coal Trestle.
Pennsylvania R. R. Co.'s Docks. Unloading Ore
Hanna's Ore Plant.
Coal Trestle and Car Dumping Plant.

OSWEGO, N. Y.
Coal and Ore Docks.

ST. CLAIR FLATS.
Str. Tashmoo Entering Ship Canal.
A Freighter Leaving Ship Canal.
Lake Vessels Old and New.
Nightfall on the River.
A Lumber Tow.

SAULT STE. MARIE, MICH.
General View of Locks from Offices.
Poe Lock, from below, closed.
Poe Lock, from below, open.
Poe Lock, from above.
Poe Lock, with Whaleback.
Weitzel Lock, from above.
Weitzel Lock, from below.
Str. North-Land Passing Locks, two views.
Upper Entrance to Lock Canal.
Gate Mechanism.
Interior of Power House.
Canadian Lock from Upper End.
Canadian Lock from Lower End.
The Rapids, looking up.
The Rapids, looking across.
Indians fishing in the rapids.

PANORAMIC VIEWS.—7x17 inches at $1.75 each.
Lackawanna Ore Docks—Unloading ore.
American Steel & Wire Co.'s Plant, Cleveland.
Ore Docks and Harbor, Cleveland.
Ore Docks, Cleveland.
Water Front, Detroit, from Windsor.
Coal and Ore Docks at Oswego.

Address: MARINE REVIEW PUB. CO.,
39-41 Wade Bldg., Cleveland. Ohio.

BUYERS' DIRECTORY OF THE MARINE TRADE.

For a more complete classification than that represented by advertisers in the Marine Review and Marine Record, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by the Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland.

See accompanying index of Advertisers for full addresses of concerns in this directory.

AIR COMPRESSORS, AIR HOISTS, ETC.

Chicago Pneumatic Tool Co.....Chicago.
"Long Arm" System Co.....Cleveland.

AIR PUMPS AND APPLIANCES.

Fore River Ship & Engine Co.....Quincy, Mass.

ANCHORS.

Baldt Anchor Co.....Chester, Pa.
Bowers, L. M. & Co. .....Binghamton, N. Y.
DeGrauw, Aymar & Co. .....New York.
Seaboard Steel Casting Co.....Chester, Pa.

ANTI-FRICTION METALS.

Cramp, Wm. & Sons.....Philadelphia.
Hardy, Wm. A.....Fitchburg, Mass.
Phosphor Bronze Smelting Co., Ltd....Philadelphia.
Pittsburg White Metal Co. .....Pittsburg, Pa.

ARTIFICIAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Bloomsburg & Co., H.....Newport News, Va.
Buffalo Forge Co.....Buffalo.
Detroit Shipbuilding Co.....Detroit.
Sturtevant, B. F. Co.....Boston.

ASBESTOS.

Johns-Manville Co., H. W.....New York.

ATTORNEYS AND PROCTORS IN ADMIRALTY.

Bacon, H. H.....Buffalo.
Brown, Harvey L.....Buffalo.
Gilchrist, Albert J.....Cleveland.
Goulder, Holding & Masten.....Cleveland.
Hoyt, Dustin & Kelley.....Cleveland.
Kremer, C. E. .....Chicago.
MacDonald, Ray G.....Chicago.
McPherson, Clark, Campbell & Jarvis.....Toronto.
Pinney & Warner.....Cleveland.
Shaw, Warren, Cady & Oakes.....Detroit.
Spencer, H. R.,.....Duluth.
White, Johnson, McCaslin & Cannon.....Cleveland.

BANKERS.

Fahey & Co.....Cleveland.
Federal Trust Co. ..... Cleveland.
Cleveland Trust Co.....Cleveland.

BAROMETERS, MARINE GLASSES, ETC.

Bliss, John & Co.....New York.
Ritchie, E. S. & Sons.....Brookline, Mass.

BELTING, RUBBER.

New York Belting & Packing Co.....New York.

BLOCKS, SHEAVES, ETC.

Boston & Lockport Block Co.....Boston, Mass.
Cleveland Block Co.....Cleveland.

BLOWERS.

Buffalo Forge Co.....Buffalo.
Sturtevant, B. F. Co.....Boston.

BOAT BUILDERS.

Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, David.....New York.
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & D. D. Co., ...
.....Mariner's Harbor, S. I., N. Y.
Marine Iron Works.....Chicago.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Warrington Iron Works..... .....Chicago.
Willard, Chas. P. & Co.....Chicago.

BOILER MANUFACTURERS.

Almy Water Tube Boiler Co.....Providence, R. I.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Babcock & Wilcox Co.....New York.
Bath Iron Works, Ltd.....Bath, Me.
Boyer's Sons, L.....New York.
Chicago Ship Building Co.....Chicago.
Clyde Machine Works.....Chicago.
Columbia Iron Works .....Port Huron.
Cramp, Wm. & Sons.....Philadelphia.
Crescent Ship Yard Co .....Elizabethport, N. J.
Dearing Water Tube Boiler Co.....Detroit.
Delauney Belleville & Co.....St. Denis, France.
Detroit Shipbuilding Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Ship & Engine Co.....Quincy, Mass.
Forest City Boiler Co. .....Cleveland.
Jenks Ship Building Co.....Port Huron, Mich.
Kingsford Foundry & Machine Works..Oswego, N. Y.
Lake Erie Boiler Works.....Cleveland.
MacKinnon Mfg. Co.....Bay City, Mich.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co. .....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Mosher, Chas. D.....New York.
Neafie & Levy Ship & Engine Building Co...Phila.
Newport News Ship Building Co..Newport News, Va.
Pusey & Jones Co.....Wilmington, Del.
Risdon Iron Works .....San Francisco.
Roberts Safety Water Tube Boiler Co...New York.
Stirling, The Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.
Trigg, Wm. R Co.....Richmond, Va.
Union Machine & Boiler Co.....Cleveland.
United States Shipbuilding Co.....New York.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co .....Chicago.

BOILER COMPOUNDS.

Dearborn Drug & Chemical Works.....Chicago.

BOILER COVERING.

Johns-Manville Co., H. W.....New York.

BOILER RIVETS.

Bourne-Fuller Co.....Cleveland.

BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co. .....Cuyahoga Falls, O.

BRASS AND BRONZE CASTINGS.

Cramp, Wm. & Sons .....Philadelphia.
Fore River Ship & Engine Co.....Quincy, Mass.
Macbeth Iron Co.....Cleveland.
Phosphor Bronze Smelting Co. .....Philadelphia.

BRASS—SHEET, ROD, ETC.

Waterbury Brass Co. .....New York.

BRASS WORK, MARINE.

Farnan Brass Works .....Cleveland.

BRIDGES, BUILDERS OF

Scherzer Rolling Lift Bridge Co. .....Chicago.

BUCKETS, ORE AND COAL.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting & Conveying Machine Co. Cleveland.
Lake Erie Boiler Works.....Cleveland.
Webster, Camp & Lane Co.....Akron, O.

CABIN AND CABINET FINISHING WOODS.

Martin-Barriss Co.....Cleveland.

CAPSTANS.

American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co. .....Bath, Me.

CARPETS, RUGS, FURNITURE, ETC.

Sterling & Welch Co. .....Cleveland.
Williams & Rodgers Co., The.....Cleveland.

CAST IRON PIPE.

Wood & Co., R. D. .....Philadelphia.

CEMENT, IRON, FOR REPAIRING LEAKS.

Smooth-On Mfg. Co. .....Jersey City, N. J.

CHAINS.

Standard Chain Co. .....Pittsburg.

CHAIN HOISTS.

Boston & Lockport Block Co. .....Boston, Mass.
Dake Engine Co. .....Grand Haven, Mich.

CHARTS.

Marine Review Pub. Co.....Cleveland.
Potter, J. D.....London.

CIRCULATOR, EQUILIBRIUM,

With Steam Heating Attachment.
Bloomsburg & Co., H. .....Baltimore, Md.

CLOCKS (Marine), CHRONOMETERS, BELLS.

Ashton Valve Co. .....Boston.
Bliss, John & Co. .....New York.
Chelsea Clock Co. .....Boston.
Ritchie, E. S. & Sons.....Brookline, Mass.

COAL PRODUCERS AND SHIPPERS.

Castner, Curran & Bullitt .....Boston.
Graham Coal & Coke Co., Ltd.....Detroit.
Hanna, M. A. & Co. .....Cleveland.
Pickands, Mather & Co. .....Cleveland.
Pittsburg Coal Co. .....Cleveland.
Rochester & Pittsburg Coal & Iron Co. ....Buffalo.

COAL AND ORE HANDLING MACHINERY.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting Machinery Co., (Inc.)...Cleveland.
Lidgerwood Mfg. Co.....New York.
Webster, Camp & Lane Co.....Akron, O.

COMPASSES.

Bliss, John & Co. .....New York.
Ritchie, E. S. & Sons.....Brookline, Mass.

COMPASS ADJUSTER.

Fields, Capt. J. M.....Cleveland.

CONDENSER TUBE PACKING.

Allen, Joseph .....Collingswood, N. J.

CONTRACTORS FOR PUBLIC WORKS.

Smith Co., L. P. & J. A. .....Cleveland.

COPPER, TIN AND SHEET IRON WORK.

Lake Erie Boiler Works.....Cleveland.
McCutcheon, C. H.....Buffalo.
Topky Brothers .....Ashtabula, O.

COPPER—SHEET, TUBES AND ROD.

Waterbury Brass Co.....New York.

CORDAGE.

Baker & Co., H. H.....Buffalo.
DeGrauw, Aymar & Co.....New York.
Upson-Walton Co.....Cleveland.

CORK JACKETS AND RINGS.

Armstrong Cork Co. ....Pittsburg, Pa.
Kahnweiler's Sons, D. ....New York.
Lane & DeGroot ..... Long Island City, N. Y.

CHAIN CONVEYORS, HOISTS.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting Machinery Co., (Inc.)...Cleveland.
Chicago Pneumatic Tool Co. .....Chicago.
General Electric Co. .....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Westinghouse Electric & Mfg. Co. .....Pittsburg.

DEAD-LIGHTS, AIR-PORTS, ETC.

"Long-Arm" System Co. .....Cleveland.

DIPPER TOOTH FOR DREDGES AND STEAM EXCAVATORS.

Pryor Patent Excavator Tooth Co..Houghton, Mich.

DIVING APPARATUS.

Morse, A. J. & Son.....Boston.
Schrader's Son, A. .....New York.

DOORS, WATER TIGHT, ETC.

Long Arm System Co.....Cleveland.

DRAWING MATERIALS.

Schwencke, Kirk & Co.....New York.

DREDGE ENGINES FOR HANDLING DUMP SCOW LINES.

Superior Iron Works .....West Superior, Wis.

DREDGING CONTRACTORS.

Smith Co., L. P. & J. A. .....Cleveland.

DRILL PRESSES—DRILLS OF ALL KINDS.

Cleveland Punch & Shear Works Co. ....Cleveland.
Railway Appliances Co .....Chicago.

DRYING APPARATUS.

Buffalo Forge Co.....Buffalo.
Sturtevant, B. F. Co. .....Boston.

DRY DOCKS.

American Ship Building Co. .....Cleveland.
Atlantic Works .....East Boston, Mass.
Bath Iron Works, Ltd. .....Bath, Me.
Buffalo Dry Dock Co. .....Buffalo.
Chicago Ship Building Co. .....Chicago.
Craig Ship Building Co. .....Toledo, O.
Cramp, Wm. & Sons .....Philadelphia.
Crescent Ship Yard Co .....Elizabethport, N. J.
Detroit Ship Building Co. .....Detroit.
Lockwood Mfg. Co. .....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Marine Construction & Dry Dock Co. ....New York.
Maryland Steel Co. .....Sparrow's Point, Md.
Milwaukee Dry Dock Co. .....Milwaukee.
Moran Bros. Co. .....Seattle, Wash.
Newport News Ship Building Co. Newport News, Va.
Pusey & Jones Co. .....Wilmington, Del.
Shipowners Dry Dock Co. .....Chicago.
Superior Ship Building Co.....Superior, Wis.
United States Shipbuilding Co.....New York.

ELECTRIC HOISTS AND CRANES.

Elwell-Parker Electric Co. .....Cleveland.
General Electric Co. .....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Westinghouse Electric & Mfg. Co. ..Pittsburg, Pa.

ELECTRIC FIXTURES AND APPLIANCES.

General Electric Co. .....Schenectady, N. Y.
United Marine Mfg. & Supply Co.....New York.
Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

ELECTRIC LIGHT AND POWER PLANTS.

Buffalo Forge Co. .....Buffalo.
Electro-Dynamic Co. .....Philadelphia.
Elwell-Parker Electric Co. .....Cleveland.
General Electric Co. .....Schenectady, N. Y.
Sturtevant, B. F. Co. .....Boston.
United Marine Mfg. & Supply Co.....New York.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

ELECTRIC STEERING GEAR, SPEED AND RUDDER INDICATORS, ETC.

Electro-Dynamic Co. .....Philadelphia.

ENGINE BUILDERS, MARINE.

American Ship Building Co.....Cleveland.
Atlantic Works .....East Boston, Mass.
Bath Iron Works, Ltd. .....Bath, Me.
Buffalo Forge Co. .....Buffalo.
Chicago Ship Building Co.....Chicago.
Chase Machine Co. .....Cleveland.
Columbia Iron Works .....Port Huron.
Craig Ship Building Co. .....Toledo, O.
Cramp, Wm. & Sons .....Philadelphia.
Crescent Ship Yard Co .....Elizabethport, N. J.
Dake Engine Co.....Grand Haven, Mich.
Detroit Ship Building Co. .....Detroit

BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

ENGINE BUILDERS, MARINE.—Continued.

Fletcher, W. & A. Co. .....Hoboken, N. J.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit, Mich.
Hall Bros. .....Philadelphia.
Jenks Ship Building Co. .....Port Huron, Mich.
Lockwood Mfg. Co. .....East Boston, Mass.
MacKinnon Mfg. Co. .....Bay City, Mich.
Maryland Steel Co. .....Sparrow's Point, Md.
Milwaukee Dry Dock Co. .....Milwaukee.
Moran Bros. Co. .....Seattle, Wash.
Mosher, Chas. D. .....New York.
Neafie & Levy Ship & Engine Bldg. Co. Philadelphia.
Newport News Ship Building Co. Newport News, Va.
Pusey & Jones Co. .....Wilmington, Del.
Risdon Iron Works .....San Francisco.
Roach's Ship Yard .....Chester, Pa.
Thropp, J. E. & Sons Co. .....Trenton, N. J.
Sheriffs Mfg. Co. .....Milwaukee.
Superior Ship Building Co.....Superior, Wis.
Trigg, Wm. R. Co.....Richmond, Va.
Trout, H. G. .....Buffalo.
United States Shipbuilding Co.....New York.
Warrington Iron Works .....Chicago.
Willard, Chas. P. & Co. .....Chicago.

ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.

Cory, Chas. & Son .....New York.
Electro-Dynamic Co. .....Philadelphia.
MacLean Hydraulic Signal Co.....Chicago.

ENGINEERING SPECIALTIES AND SUPPLIES.

Crane Co. .....Chicago.
Farnan Brass Works .....Cleveland.
Kieley & Mueller .....New York.
McCutcheon, C. H. .....Buffalo.
New York Belting & Packing Co.....New York.
Reilly Repair & Supply Co., James.....New York.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Electro-Dynamic Co. .....Philadelphia.
Garrett-Cromwell Engineering Co.....Cleveland.
Gaskin, Edward .....Buffalo.
Hunt, Robt. W. & Co. .....Chicago.
Kidd, Joseph .....Duluth, Minn.
Logan, Robert .....Cleveland.
Mosher, Chas D. .....New York.
Newman, R. L. .....New York.
Pittsburg Testing Laboratory, Ltd.....Pittsburg.
Powell, Ambrose V. .....Chicago.
Roelker, H. B. .....New York.
Sadler, Perkins & Field.....New York.
Wood, W. J. .....Chicago.

EVAPORATING AND DISTILLING APPARATUS.

Reilly Repair & Supply Co., James....New York.

FANS FOR VENTILATION, EXHAUST, ETC.

Buffalo Forge Co. .....Buffalo.
Sturtevant, B. F. Co. .....Boston.

FEED WATER PURIFIERS AND HEATERS.

Learmonth, Robert .....Buffalo.
Reilly Repair & Supply Co., James.....New York.
Ross Valve Co. .....Troy, N. Y.

FIXTURES FOR LAMPS, OIL AND ELECTRIC.

General Electric Co. .....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

FORGES.

Buffalo Forge Co. .....Buffalo.
Sturtevant, B. F. Co. .....Boston.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co. .....Cleveland.
Fore River Ship & Engine Co. .....Quincy, Mass.
Macbeth Iron Co.....Cleveland.

FLUE WELDING.

Fix's, S. Sons .....Cleveland.

FURNACES FOR BOILERS.

Continental Iron Works.....New York.

FUELING COMPANIES AND COAL DEALERS.

Castner, Curran & Bullitt (Pocahontas) ....Phila.
Graham Coal & Coke co., Ldt.....Detroit.
Hanna, M. A. & Co. .....Cleveland.
Pickands, Mather & Co. .....Cleveland.
Pittsburg Coal Co. .....Cleveland.
Rochester & Pittsburg Coal & Iron Co. ....Buffalo.
Smith, Stanley B. & Co. .....Detroit.
Youghiogheny & Lehigh Valley Coal Co...Chicago.

GASKETS, RUBBER.

New York Belting & Packing Co.....New York.

GAS BUOYS.

Safety Car Heating & Lighting Co. ..New York.

GAS AND GASOLINE ENGINES.

Chase Machine Co. .....Cleveland.

GAGES, STEAM AND VACUUM.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.

GRAPHITE.

Dixon Crucible Co., Joseph .....Jersey City, N. J.

HAMMERS, STEAM.

Chase Machine Co. .....Cleveland.

HARDWARE, SHIP.

Topky Brothers .....Ashtabula, O.

HATCH GEARS.

"Long-Arm" System Co. .....Cleveland.

HEATING APPARATUS.

Buffalo Forge Co. .....Buffalo.
Sturtevant, B. F. Co. .....Boston.

HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.
Brown Hoisting Machinery Co., Inc. ....Cleveland.
Chase Machine Co. .....Cleveland.
Elwell-Parker Electric Co. .....Cleveland.
General Electric Co. .....New York.
Hyde Windlass Co. .....Bath, Me.
Lidgerwood Mfg. Co.....New York.
Marine Iron Co. .....Bay City.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

HOSE FITTINGS.

Farnan Brass Works. .....Cleveland.

HOSE, RUBBER.

New York Belting & Packing Co.....New York.

HYDRAULIC MACHINERY.

Watson-Stillman Co., The.....New York.
Wood & Co., R. D. .....Philadelphia.

ICE MACHINERY.

American Linde Refrigerating Co. .....New York.
Roelker, H. B. .....New York.

INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.

INJECTORS.

American Injector Co.....Detroit.
Crane Co. .....Chicago.
Jenkins Bros. .....New York.
Lunkenheimer Co. .....Cincinnati.
Penberthy Injector Co. .....Detroit, Mich.

INSURANCE, MARINE.

Brown & Co. .....Buffalo.
Brown, W. W. .....Cleveland.
Dunham, R. J. .....Chicago.
Elphicke, C. W. & Co. .....Chicago.
Fleming & Co., P. H. .....Chicago
Hawgood & Co., W. A. .....Cleveland.
Helm & Co., D. T. .....Duluth.
Hutchinson & Co. .....Cleveland.
Insurance Co. of North America....Philadelphia
McCarthy, T. R. .....Montreal.
McCurdy, Geo. L. .....Chicago.
Mitchell & Co. .....Cleveland.
Peck, Chas. E. & W. F. ...New York and Chicago.
Richardson, W. C. .....Cleveland.
Sullivan, D. & Co. .....Chicago.
Weeks, F. H. .....New York.

IRON ORE AND PIG IRON.

Bourne-Fuller Co. .....Cleveland.
Hanna, M. A. & Co. .....Cleveland.
Pickands, Mather & Co. .....Cleveland.

LATHE, FOR CUTTING PIPE THREADS.

Kent Machine Works .....Brooklyn, N. Y.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Warrington Iron Works .....Chicago.
Willard, Chas. P. .....Chicago.

LIFE FLOATS.

Carley Life Float Co. .....New York.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong Cork Co. .....Pittsburg.
Drein, Thos. & Son .....Wilmington, Del.
Kahnweiler's Sons, D. .....New York.
Lane & DeGroot .....Long Island City, N. Y.
Marine Construction & Dry Dock Co.....
.....Mariner's Harbor, S. I., N. Y.

LIGHTS, SIDE AND SIGNAL.

Helvig, H. A. J.....New York.
Russell & Watson .....Buffalo.

LOGS.

Walker & Sons, Thomas .....Birmingham, Eng.
Nicholson Ship Log Co. .....Cleveland.
Also Ship Chandlers.

LUMBER.

Martin-Barriss Co. .....Cleveland.
Moran Bros. Co. .....Seattle, Wash.

MACHINISTS.

Chase Machine Co.....Cleveland.
Macbeth Iron Co. .....Cleveland.
Union Machine & Boiler Co.....Cleveland.
Ward Machine Co.....Cleveland.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc. .....Philadelphia.

MACHINERY, NEW AND SECOND HAND.

Bowler & Co. Geo. H. .....Cleveland.
Clyde Machine Works.....Chicago.

MAN-HOLES, SWING DOORS, ETC.

"Long-Arm" System Co. .....Cleveland.

MARINE RAILWAYS, BUILDERS OF

Crandall & Son, H. I. .....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.....New York.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co. .....Cleveland
Bloomsburg & Co., H. .....Baltimore, Md.
Buffalo Forge Co. .....Buffalo.
Detroit Ship Building Co. .....Detroit.
Sturtevant, B. F. Co. .....Boston.

METALLIC PACKING.

American Metallic Packing Co. .....Cleveland.
Hayden Mfg. Co., N. L.....Columbus, O.
Katzenstein, L. & Co. .....New York.
U. S. Metallic Packing Co. .....Philadelphia.

METAL POLISH.

Bertram's Oil Polish Co. .....Boston.

MOTORS, GENERATORS—ELECTRIC.

Buffalo Forge Co. .....Buffalo.
Electro-Dynamic Co. .....Philadelphia.
Elwell-Parker Electric Co. .....Cleveland.
General Electric Co. .....Schenectady, N. Y.
"Long-Arm" System Co. .....Cleveland.
Sturtevant, B. F. Co. .....Boston.
United Marine Mfg. & Supply Co.....New York.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

NAUTICAL INSTRUMENTS.

Bliss, John & Co. .....New York.
Ritchie, E. S. & Sons .....Brookline, Mass.

NAVAL ARCHITECTS.

Gaskin, Edward .....Buffalo.
Kidd, Joseph .....Duluth, Minn.
Logan, Robert .....Cleveland.
Mosher, Chas. D. .....New York.
Newman, R. L. .....New York.
Sadler, Perkins & Field.....New York
Wood, W. J. .....Chicago.

OAKUM.

DeGrauw, Aymar & Co. .....New York.
Stratford Oakum Co.,.....Jersey City, N. J.

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph .....Jersey City, N. J.
Standard Oil Co. .....Cleveland.

PACKING.

American Metallic Packing Co. .....Cleveland.
American Steam Packing Co. .....Boston.
Crane Co. .....Chicago.
Hayden Mfg. Co., N. L.....Columbus, O.
Jenkins Bros. .....New York.
Katzenstein, L. & Co. .....New York.
New York Belting & Packing Co.....New York.
United States Metallic Packing Co. ....Philadelphia.

PAINTS.

Baker, Howard H. & Co. .....Buffalo.
Berry Bros., Ltd. .....Detroit.
Mohawk Paint & Chemical Co.....New York.
New Jersey Zinc Co. .....New York.
Topky Brothers .....Ashtabula, O.
Upson-Walton Co. .....Cleveland.

PATENT ATTORNEYS.

Thurston & Bates .....Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc. .....Philadelphia.

PIPE—BRASS AND COPPER, IRON PIPE SIZE.

Waterbury Brass Co.....New York.

PIPE, WROUGHT IRON.

Bourne-Fuller Co .....Cleveland.
Crane Co .....Chicago.
Macbeth Iron Co.....Cleveland.

PLANING MILL MACHINERY.

Atlantic Works, Inc. .....Philadelphia.

PLATE BENDING AND PLANING MACHINES.

Wood & Co., R. D. .....Philadelphia.

PLUMBING, MARINE.

Mott, J. L., Iron Works .....New York.
Reilly Repair & Supply Co., James....New York.
Sands, Alfred B. & Son .....New York.

PNEUMATIC TOOLS.

Allen, John F., ... New York.
Chicago Pneumatic Tool Co. .....Chicago.

POLISH FOR METALS.

Bertram's Oil Polish Co.....Boston.

POWER DOORS AND HATCHES.

"Long-Arm" System Co. .....Cleveland.

PRESSURE REGULATORS.

Kieley & Mueller .....New York
Ross Valve Co. .....Troy, N. Y.

BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

PROPELLER WHEELS.

American Ship Building Co. .....Cleveland
Atlantic Works .....East Boston, Mass.
Bath Iron Works, Ltd. .....Bath, Me.
Cramp, Wm. & Sons.....Philadelphia.
Crescent Ship Yard Co .....Elizabethport, N. J.
Detroit Ship Building Co. .....Detroit.
Fore River Ship & Engine Co. .....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Hyde Windlass Co. .....Bath, Me.
Jenks Ship Building Co. .....Port Huron, Mich.
Lockwood Mfg. Co. .....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
MacKinnon Mfg. Co. .....Bay City, Mich.
Maryland Steel Co. .....Sparrow's Point, Md.
Milwaukee Dry Dock Co. .....Milwaukee.
Moran Bros. Co. .....Seattle, Wash.
Neafie & Levy Ship & Engine Bldg. Co.....Phila.
Newport News Ship Bldg. Co...Newport News, Va.
Phosphor Bronze Smelting Co., Ltd...Philadelphia.
Pusey & Jones Co. .....Wilmington, Del.
Risdon Iron Works .....San Francisco.
Roelker, H. B. .....New York.
Sheriffs Mfg. Co. .....Milwaukee.
Superior Ship Building Co.....Superior, Wis.
Thropp & Sons Co., J. E. .....Trenton, N. J.
Trigg, Wm. R. Co. .....Richmond, Va.
Trout, H. G. .....Buffalo.
United States Shipbuilding Co.....New York.

PROJECTORS, ELECTRIC.

Elwell-Parker Electric Co. .....Cleveland.
General Electric Co. .....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F. Mfg. Co. .....New York.
Clyde Machine Works .....Chicago.
Great Lakes Engineering Works.....Detroit.
Kingsford Foundry & Machine Wks. Oswego, N. Y.
Long Arm System Co. .....Cleveland.

PUNCHES, RIVETERS, SHEARS.

Chicago Pneumatic Tool Co. .....Chicago.

REFRIGERATING APPARATUS.

Roelker, H. B. .....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register .....Cleveland.
Record of American & Foreign Shipping.New York.

RELEASING HOOKS FOR DETACHING BOATS.

Standard Automatic Releasing Hook Co. New York.

RIVETS, STEEL, FOR SHIPS AND BOILERS.

Bourne-Fuller Co. .....Cleveland.

RANGES.

Russell & Watson .....Buffalo.

RIVETS—BRASS AND COPPER.

Waterbury Brass Co.....New York.

RUBBER INSULATED WIRES.

Roebling's Sons, Jno. A...New York and Cleveland.

SAFETY VALVES.

American Steam Gauge Co. .....Boston.
Ashton Valve Co.....Boston.
Hayden Mfg. Co., N. L.....Columbus, O.
Lunkenheimer Co. .....Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co. .....Buffalo.
Upson-Walton Co. .....Cleveland.
Wilson & Silsby .....Boston.

SALVAGE COMPANIES.

See Wrecking Companies.

SCHOOLS—NAUTICAL, ENGINEERING.

Chicago Nautical School .....Chicago.

SEARCH LIGHTS.

Elwell-Parker Electric Co. .....Cleveland.
General Electric Co. .....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

SHEARS.

See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co. .....Cleveland.

SHIP BUILDERS.

American Ship Building Co. .....Cleveland.
Atlantic Works .....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Buffalo Dry Dock Co. .....Buffalo.
Columbia Iron Works .....Port Huron.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co. .....Toledo, O.
Chicago Ship Building Co.....Chicago.
Crescent Ship Yard Co .....Elizabethport, N. J.
Detroit Ship Building Co. .....Detroit.
Fore River Ship & Engine Co. .....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Jenks Ship Building Co. .....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Marine Construction & Dry Dock Co.....
.....Mariner's Harbor, S. I., N. Y.
Maryland Steel Co .....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co. .....Seattle, Wash.
Neafie & Levy Ship & Engine Bldg. Co.....Phila.
Newport News Ship Bldg. Co....Newport News, Va.
Pusey & Jones Co. .....Wilmington, Del.
Risdon Iron Works .....San Francisco.
Roach's Ship Yard .....Chester, Pa.
Smith & Son, Abram .....Algonac, Mich.
Trigg, Wm. R. Co. .....Richmond, Va.
United States Shipbuilding Co.....New York.
Warrington Iron Works .....Chicago.
Willard, Chas. P. & Co. .....Chicago.

SHIP CHANDLERS.

Baker, Howard H. & Co. .....Buffalo.
Moran Bros. Co. .....Seattle, Wash.
Reilly Repair & Supply Co., James....New York.
Upson-Walton Co. .....Cleveland.

SHIP LANTERNS AND LAMPS.

Helvig, H. A. J.....New York.
Page Bros. & Co.....New York.
Russell & Watson.....Buffalo.

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co. .....Jersey City, N. J.

SPARS—LARGE SIZES.

Moran Bros. Co.....Seattle, Wash.

STAYBOLTS, IRON OR STEEL, HOLLOW, OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Elwell, Jas. W. & Co.....New York.
Holmes, Samuel.....New York.
King, Rufus S.....New York.
McCarthy, T. R.....Montreal, Can.
Newman, R. L.....New York.
Weeks, F. H.....New York.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line.....New York.
Erie & Western Trans. Co. .....Buffalo.
International Nav. Co.....Philadelphia.
Pere Marquette R. R. & S. S. Line.....Milwaukee.
Red Star Line.....New York.

STEEL CASTINGS.

Seaboard Steel Casting Co.....Chester, Pa.
Macbeth Iron Co.....Cleveland.

STEERING APPARATUS.

American Ship Building Co.....Cleveland.
Chase Machine Co. .....Cleveland.
Dake Engine Co.....Grand Haven, Mich.
Detroit Shipbuilding Co.....Detroit.
Electro-Dynamic Co.....Philadelphia.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Sheriff Mnfg. Co.....Milwaukee.

STOCKS, BONDS, SECURITIES.

Brown, W. W.....Cleveland.
Fahey & Co.....Cleveland.

SUBMARINE DIVING APPARATUS

Morse & Son, A. J.....Boston.
Schrader's Son, A.....New York.

SURVEYORS, MARINE.

Gaskin, Edward.....Buffalo.
Newman, R. L.....New York.
See, Horace.....New York.
Wood, W. J.....Chicago.

TESTS OF MATERIAL.

Hunt, Robert W. & Co.....Chicago.
Pittsburg Testing Laboratory, Ltd.....Pittsburg.

TILING, INTERLOCKING RUBBER.

New York Belting & Packing Co.....New York.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Allen, John F.....New York.
Chicago Pneumatic Tool Co.....Chicago.
Watson-Stillman Co.....New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc.....Philadelphia.

TOWING MACHINES.

American Ship Windlass Co.....Providence, R. I.
Chase Machine Co.....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co....Kingston, Ont.
Midland Towing & Wrecking Co., Ltd.Midland, Ont.

TRAPS, STEAM.

Kieley & Mueller.....New York.

TRUCKS.

Boston & Lockport Block Co..... .....Boston.

TUBING, SEAMLESS.

National Tube Co.....Pittsburg.
Waterbury Brass Co.....New York.

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Crane Co. .....Chicago.
Farnan Brass Works .....Cleveland.
Hayden Mfg. Co., N. L.....Columbus, O.
Jenkins Bros.....New York.
Kieley & Mueller.....New York.
Lunkenheimer Co.....Cincinnati.
Ross Valve Co. .....Troy, N. Y.

VALVES FOR WATER AND GAS.

Wood & Co., R. D.....Philadelphia.
Ross Valve Co. .....Troy, N. Y.

VARNISHES.

Berry Brothers, Ltd.....Detroit.
New Jersey Zinc Co.....New York.
Also Ship Chandlers.

VESSEL CASTINGS.

American Ship Building Co.....Cleveland.
Macbeth Iron Co.....Cleveland.

VESSEL FURNISHINGS.

Sterling & Welch Co. .....Cleveland.
Williams & Rodgers Co., The.....Cleveland.

VESSEL AND FREIGHT AGENTS.

Boland, John J.....Buffalo.
Brown & Co.....Buffalo.
Brown, W. W.....Cleveland.
Dunham, R J..... .....Chicago.
Elwell, Jas. W. & Co.....New York.
Elphicke, C. W & Co.....Chicago.
Fleming & Co., P. H. .....Chicago.
Hall & Root.....Buffalo.
Helm & Co., D. T. .....Duluth.
Hawgood & Co., W. A.....Cleveland.
Holmes, Samuel.....New York.
Hutchinson & Co.....Cleveland.
King, Rufus S.....New York.
McCarthy, T. R.....Montreal.
Newman, R. L.....New York.
Mitchell & Co.....Cleveland.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.
Weeks, F. H.....New York.

VENTILATING APPARATUS FOR SHIPS.

Buffalo Forge Co. .....Buffalo.
Sturtevant, B. F. Co.....Boston.

WIRE—BRASS AND COPPER.

Waterbury Brass Co.....New York.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co.....Buffalo.
DeGrauw, Aymar & Co. .....New York
Upson-Walton Co.....Cleveland.

WHISTLES, STEAM.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Farnan Brass Works .....Cleveland.
Lunkenheimer Co.....Cincinnati.

WHITE METAL—SHEETS, RODS AND WIRE.

Waterbury Brass Co.....New York.

WINDLASSES.

American Ship Windlass Co.....Providence, R. I.
American Ship Building Co. .....Cleveland
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.

WINCHES.

American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co.....Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc.....Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co....Kingston, Ont.
Midland Towing & Wrecking Co., Ltd.Midland, Ont.

YACHT AND BOAT BUILDERS.

Drein, Thos. & Son.....Wilmington, Del.
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & Dry Dock Co. ...New York.
Truscott Boat Mfg. Co. .....St. Joseph, Mich.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

YAWLS.

Drein, Thos. & Son.....Wilmington, Del.
Lane & DeGroot.....Long Island City, N. Y.

ALPHABETICAL INDEX OF ADVERTISERS IN THE MARINE REVIEW AND MARINE RECORD.

The star (*) indicates that the advertisement appears alternate weeks. For addresses see advertisements on pages noted.

*Allen, John F. 11
Almy Water Tube Boiler Co.... 15
American Injector Co 10
American Line 13
American Metallic Packing Co.... 11
American Ship Building Co..... 1
American Ship Masters Ass'n... 6
American Ship Windlass Co..... 2
American Steam Gauge Co..... 1
*American Steam Packing Co.....35
Anchor Line 45
Armstrong Cork Co..... 48
Ashton Valve Co..... 16
Atlantic Works 5
*Atlantic Works, Inc..... 11

Babcock & Wilcox Co..... 15
Baldt Anchor Co. 9
Baker, Howard H. & Co..... 48
Bartlett & Snow Co., C. O..... 2
Bath Iron Works, Ltd..... 1
Bertram's Oil Polish Co..... 1
Berry Brothers, Ltd..... 10
Blake, Geo. F., Mfg. Co..... 9
*Bliss, John & Co..... 13
*Bloomsburg & Co., H..... 9
Boland, J. J..... 40
*Boston & Lockport Block Co.... 48
Bourne-Fuller Co. 16
Bowers, L. M. & Co..... 9
Bowler & Co., Geo. H..... 37
*Boyer's, L. Sons 48
Brown, Harvey L. 40
Brown & Co. 40
Brown Hoisting Machinery Co., Inc. 2
Brown, W. W. 40
Buffalo Dry Dock Co..... 46
Buffalo Forge Co..... 16

Carley Life Float Co..... 4
Castner, Curran & Bullitt..... 39
Chase Machine Co. 8
*Chelsea Clock Co..... 3
Chicago & N. W. Ry. 45
Chicago Pneumatic Tool Co..... 16
Chicago Ship Building Co..... 46
Cleveland City Forge & Iron Co.. 48
Cleveland Trust Co. 36
Columbia Iron Works 5
Continental Iron Works 2
Cory, Chas. & Son 12
*Craig Ship Building Co..... 13
Cramp, Wm. & Sons, S. & E. B. Co. 1
*Crandall & Son, H. I. 11
Crane Co. 4-7
Crescent Ship Yard Co..... 4

Dake Engine Co. 12
Dearborn Drug & Chemical Wks. 13
Dearing Water-Tube Boiler Co.. 32
DeGrauw, Aymar & Co..... 9
Delauney, Belleville & Co..... 30
Delaware River Iron S. B. & E. Works. 5
Detroit Ship Building Co..... 1
Dixon Crucible Co., Joseph..... 12
Donnelly Salvage & Wrecking Co. 7
Drein, Thos. & Son..... 4
Dunham, R. J. 40

Electro-Dynamic Co 1
Elphicke, C. W. & Co..... 40
Elwell, Jas. W., & Co..... 40
Elwell-Parker Electric Co. 2
Erie & Western Trans. Co. 45

Fahey & Co. 30
Falls Hollow Staybolt Co..... 4
Farnan Brass Works 12
Federal Trust Co. 36
Fields, Capt J. M..... 37
Fix's S., Sons 37
Fleming & Co,, P. H 40
Fletcher, W. & A. Co..... 4
Fogg, M. W. 38
Fore River Ship & Engine Co.... 5
Forest City Boiler Co. 47

Garrett-Cromwell Engineering Co. 3
Gaskin, Edward 41
General Electric Co. 16
Gilchrist, Albert J. 40
Goulder, Holding & Masten..... 40
Graham Coal & Coke Co..... 38
Great Lakes Engineering Works. 34
Great Lakes Register 7

Hall & Root 40
Hanna, M. A. & Co..... 38
Hardy, Wm. A. 14
Hawgood & Co., W. A..... 40
Hayden Mfg. Co., N. L..... 37
Helm & Co., D. T..... 40
Helvig, H. A. J..... 3
Herriman, F. D. 7
Holmes, Samuel 40
Hoyt, Dustin & Kelley 40
Hunt, Robert W. & Co..... 41
Hutchinson & Co. 40
Hyde Windlass Co. 48

Insurance Co. of North America.. 7
International Navigation Co. 13

Jenkins Brothers 16
Jenks Ship Building Co..... 47
Johns-Manville Co., H. W..... 31

Kahnweiler's Sons, David..... 4
Katzenstein, L. & Co..... 3
Kent Machine Works 37
Kidd, Joseph 40
*Kieley & Mueller..... 14
Kingsford Foundry & Machine Works 13
King, Rufus S. 40
Kremer, C. E. 40

Lake Erie Boiler Works..... 14
Lane & DeGroot 4
*Learmonth, Robert 3
Lidgerwood Mfg. Co. 6
Lockwood Mfg. Co. 5
Logan, Robert 41
"Long-Arm" System Co. 1
L. S. & M. S. Ry..... 45
Lunkenheimer Co. 12

McCarthy, T. R. 40
McCurdy, Geo. L. 7
McCutcheon, C. H. 11
McPherson, Clark, Campbell & Jarvis 40
Macbeth Iron Co. 48
MacDonald, Ray G. 40
MacKinnon Mfg. Co. 8
MacLean Hydraulic Signal Co..... 6
Manitowoc Dry Dock Co. 5
Marine Construction & Dry Dock Co. 5
*Marine Iron Co. 38
Martin-Barriss Co. 9
Maryland Steel Co. 5
Midland Towing & Wrecking Co., Ltd. 48
Milwaukee Dry Dock Co. 46
Mitchell & Co. 40
Mohawk Paint & Chemical Co... 7
*Moran Bros. Co. 47
Morse & Son, A. J. 33
Mosher, Chas. D. 41
*Mott, J. L., Iron Works..... 13

National Tube Co. 14
Neafie & Levy Co. 4
Newman, R. L. 40
Newport News Ship Building & Dry Dock Co. 5
New Jersey Zinc Co. 7
New York Belting & Packing Co. 10
Nicholson Ship Log Co..... 3
North River Iron Works .....

Peck, Chas. E. & W. F..... 7
Penberthy Injector Co..... 10
Pere Marquette R. R. & S. S. Line 45
Phosphor Bronze Smelting Co. Ltd. 14
Pickands, Mather & Co. 38
Pinney & Warner 40
Pittsburg Coal Co. 39
Pittsburg Testing Laboratory, Ltd. 41
Pittsburg White Metal Co..... 33
Potter, J. D..... 3
Powell, Ambrose V. 41
Pryor Patent Excavator Tooth Co.. 8
Pusey & Jones Co. 5

Railway Appliances Co..... 33
Record of American & Foreign Shipping 6
Red Star Line 13
Richardson, W. C. 40
*Reilly Repair & Supply Co., Jas. 9
Risdon Iron Works 5
*Ritchie & Sons, E. S..... 14
Roach's Ship Yard 5
Roberts Water Tube Boiler Co.. 15
Rochester & Pittsburg Coal & Iron Co. 39
Roelker, H. B. 5
Ross Valve Co. 12
Russell & Watson 6

Sadler, Perkins & Field..... 41
Safety Car Heating & Lighting Co. 3
Sands, Alfred B. & Son..... 12
Scherzer Rolling Lift Bridge Co. 9
Schrader's Sons, A. 1
Schwencke, Kirk & Co. 41
Seaboard Steel Casting Co. 32
Shaw, Warren, Cady & Oakes.... 40
Sheriffs Mfg. Co. 8
Shipowners Dry Dock Co. 16
*Smith & Son, Abram.....38
Smith Co., L. P. & J. A..... 8
Smith, Stanley B. & Co..... 39
Smooth-On Mfg. Co. 9
Spencer, H. R. 40
Standard Chain Co. 6
*Standard Oil Co. 14
Standard Releasing Hook Co. .. 38
Sterling & Welch Co. 36
Stirling Co. 15
Stratford Oakum Co., Geo. 6
Sturtevant, B. F. Co. 48
Sullivan & Co. 40
*Superior Iron Works 8
Superior Ship Building Co..... 46

Taylor Water Tube Boiler Co... 15
Thropp, J. E. & Sons Co..... 12
Thurston & Bates 41
*Topky Bros. 12
Trigg Co., Wm. R. 4
Trout, H. G. 8
Truscott Boat Mfg. Co. 38

Union Machine & Boiler Co..... 38
United Marine Mfg. & Supply Co 31
Upson-Walton Co. 48
U. S. Metallic Packing Co..... 48
U. S. Shipbuilding Co..... 4

Walker, Thomas & Son..... 3
Ward Machine Co. 47
Warrington Iron Works 5
Waterbury Brass Co. 48
*Watson-Stillman Co. 47
Webster, Camp & Lane Co..... 2
Weeks, F. H. 40
Westinghouse Electric & Mfg. Co. 6
White, Johnson, McCaslin & Cannon 40
*Willard, Chas. P. & Co..... 13
Williams & Rodgers Co., The... 36
Wood, W. J. 40

Youghiogheny & Lehigh Coal Co.. 39

PERE MARQUETTE
R.R. & STEAMSHIP LINE

Chicago Milwaukee, Manitowoc, and Grand Rapids, Saginaw, Port Huron, Detroit, Toledo

H. F. MOELLER, Gen'l Passenger Agent
Send for folder. DETROIT, MICH

The Erie & West. Transportation Co.
ANCHOR LINE.

PASSENGER SERVICE Steamers.

India. China. Japan.

PORTS OF CALL.

Buffalo. Erie. Cleveland.
Detroit. Mackinac Island.
Sault Ste. Marie. Marquette. Houghton.
Hancock. Duluth.

FREIGHT SERVICE Steamers.

Alaska. Codorus. Mahoning.
Schuylkill. Conestoga. Clarion.
Delaware. Juniata. Lehigh.
Lycoming. Susquehanna. Wissahickon.
Conemaugh.

PORTS OF CALL.

Buffalo. Erie. Cleveland.
Detroit. Sault Ste. Marie. Marquette.
Houghton. Hancock. Duluth.
W. Superior Chicago. Milwaukee.

CHAS. E. MARKHAM, General Passenger Agent, Buffalo N. Y.
E. T. EVANS, Western Manager, Buffalo N. Y.

LAKE SHORE & MICHIGAN SOUTHERN RY.

Eastward.	Arrive from West	Depart East.
No. 18, Southwestern Lim	.....	1:50am
No. 22, Lake Shore Lim...	*2:15am	*2:20am
No. 20, Chi & Cleve Ex....	*7:20am	.....
No. 28, N Y & Bost Ex ...	*7:40am	*8:00am
No. 40, Toledo & Buff Ac.	†10:00am	†10:40am
No. 32, Fast Mail	*11:25am	*11:30am
No. 44, Ac via Sandusky..	†1:40pm	..
No. 46, Southwestern Ex.	....	*3:00pm
No. 106, Conneaut Accom	.....	†4:30pm
No. 6, Lim Fast Mail....	*5:40pm	*5:45pm
No. 26, 20th Cent L m. ...	*7:40pm	*7:43pm
No. 10 C., N Y & B Sp....	*7:30pm	*7:50pm
No. 16, New Eng Ex.....	*10:30pm	*10:35pm
No. 2, Day Express.	†9:10pm	†9 25pm
No. 126, Norwalk Accom.	†7:50am	.....

Westward.	Arrive from East.	Depart West.
No. 11, Southwestern Lim	*3:25am	....
No. 7, Day Express.	.....	†6:10am
No. 15, Bost & Chi Sp.....	*3:10am	*3:15am
No. 19, Lake Shore Lim..	*7:15am	*7:20 m
No. 23, Western Express.	*10:30am	*10:35am
No. 33, Southern Express	*12:25pm	....
No. 133, Cleve & Det Ex..	....	*12:45pm
No. 47, Accomodation.....	†11.20am	†3:00pm
No. 141, Sandusky Accom.	. ....	†3:10pm
No. 43, Fast Mail	*4:35pm	*4:40pm
No. 127, Norwalk Accom..	.. ..	†5:10pm
No. 37 Pacific Express...	*7:00pm	*7:20pm
No 3, Fast Mail Lim.....	*10:50pm	*10:55pm
No. 115, Conneaut Accom.	*8:30am	.....

*Daily. †Except Sunday.
Trains Nos. 23, 28 and 37 run via Erie Station.
City Ticket Office, 237 Superior St.

MANUFACTURERS

Contemplating establishing plants in the West should take advantage of a location on

THE NORTH-WESTERN LINE

Chicago & North-Western Ry.

which reaches the famous

WATER POWERS, COAL FIELDS, IRON ORE RANGES, HARD AND SOFT LUMBER DISTRICTS

of the West and Northwest, and affords the best means of transportation to the markets of the world.

FOR FURTHER PARTICULARS APPLY TO

MARVIN HUGHITT, Jr., *Freight Traffic Mgr.*, E. D. BRIGHAM, *Gen'l Freight Agent*, CHICAGO.

WILLIAM L. BROWN, President. B. W. WELLS, Vice-Pres. O. R. SINCLAIR, Sec'y & Treas. ALFRED G. SMITH, Gen'l Supt.

CHICAGO SHIP BUILDING COMPANY,

LONG DISTANCE TELEPHONES.
Ship Yard and Dry Dock Office, "South Chicago 40."
Chicago Office, 1125 Rookery, "Harrison," 1207.

Steel Ship Builders and Dry Dock Proprietors.

Dry Dock and Yards: 101st St. and Calumet River, - - - - CHICAGO, ILL.

MILWAUKEE DRY DOCK COMPANY

MILWAUKEE, WISCONSIN

SHIP REPAIRS

OF ALL KINDS

Two Ship Yards offer every Facility for the Repair of both Steel and Wooden Vessels

South Yard Dock....
is 450 ft. long on keel blocks; 460 feet over all; 56 feet width of gate, and 16 feet over sill.

West Yard Dock....
312 feet on keel blocks; 45 feet width of gate, and 12 feet over sill.

RUDDER PIT IN EACH DOCK.
ELECTRIC LIGHTS FOR NIGHT WORK.

Main Office at **SOUTH YARD,**
Foot of Washington St.

EDWARD SMITH, President. WILLIAM KNIGHT, Asst. Sec'y & Treas. W. T. NEVINS, Superintendent.

THE BUFFALO DRY DOCK CO.

GANSON STREET AND BUFFALO RIVER.

Operating Four Docks, Sixty-ton Shear Legs, and in every way Equipped

WITH MODERN PLANT FOR

The Building and Economical Repairs of

STEEL AND WOODEN SHIPS

LONG DISTANCE TELEPHONE CONNECTIONS:

Office Telephone, 515 Seneca. President's Telephone, 279 Seneca, Office. President's Telephone. 209 Bryant, Residence.
Asst. Sec'y & Treas., Telephone, 609 Bryant, Residence. Superintendent, Telephone, 108 South, Residence.

THE SUPERIOR SHIPBUILDING COMPANY

Dry Dock and Repairs of All Kinds	SHIP AND ENGINE BUILDERS	Two Largest Dry Docks On the Lakes

Large Stock of Material Always on Hand for Repairing Wooden and Metal Ships.

Repairing Promptly Attended to, Night or Day.

West Superior, Wis.

The Jenks Ship Building Co.

STEEL SHIP BUILDERS,

MARINE ENGINES AND BOILERS.

Prompt Attention Given to Repairs of all Kinds on Ships, Engines and Boilers.

OFFICE AND MACHINE SHOPS AT FOURTH STREET.

YARDS AT FOOT OF LINCOLN AVENUE.

PORT HURON, - - MICHIGAN.

MORAN BROS. COMPANY

SEATTLE, WASHINGTON

SHIP AND ENGINE BUILDERS

STEEL AND WOOD VESSELS, STEAM OR SAIL

FOR OCEAN, SOUND AND RIVER SERVICE

FOUNDRY, MACHINE, BOILER AND FORGE SHOPS

LARGEST TOOLS AND EQUAL TO ANY REQUIREMENT

HEAVY FORGINGS A SPECIALTY

DRY DOCK AND MARINE RAILWAY

Two-Section balanced floating dry dock, 400 ft. long, 60 ft. between towers; patent steel wedge keel blocks; 12,000 tons displacement.

CAPACITY OF MARINE RAILWAY 1500 TONS

SHIP CHANDLERY, ENGINEERS' SUPPLIES

SAW AND PLANING MILL

CAPACITY: TIMBER, 48 INCHES SQUARE, 125 FEET LONG

Including every description of ROUGH, DRESSED or KILN DRIED

YELLOW FIR, RED CEDAR OR SPRUCE

We make a specialty of long and large timber and can DRESS FOUR SIDES 20 x 30 INCHES.

SPARS THE LONGEST, LARGEST, CLEAREST AND BEST IN THE WORLD; ROUGH OR HEWN.

PILES OR TIMBER OF ANY DESCRIPTION.

CARS FROM ALL TRANSCONTINENTAL ROADS ENTER OUR YARDS AND DOCKS

DOCK SHIPMENTS TO ALL PARTS OF THE WORLD

ELECTRIC CRANE Capacity to transfer 75 tons from car to vessel

WE INVITE CORRESPONDENCE

THE ONLY

MARINE DIRECTORY

BLUE BOOK

—OF—

AMERICAN SHIPPING

NOW IN ITS SEVENTH YEAR.

* * * *

Every ship builder, marine engine and boiler builder, ship owner, naval architect, marine engineer, and, in fact, everyone in the United States whose business is with ships is mentioned in the Blue Book and his address given. The aim has been to make it a complete working directory of the marine trade of the United States. With its aid you may reach anyone connected with this great branch of industry.

Its statistics of waterborne commerce are thoroughly reliable. The section devoted to the commerce of the great lakes with its iron mines and their output, its coal trade and dock facilities, its grain trade and elevators, its ships and their owners, is very thorough and absolutely authentic. . . . . .

* * * *

MARINE REVIEW PUB. CO.

39-40-41 WADE BLDG., CLEVELAND, O.

Nautical Encyclopedia

PRICE $3.00.

Is in all respects a work up to date, correct as to every term known to the shipping world.

Divided as to departments of Naval Architecture, Marine Engineering, etc.

SENT ON APPROVAL.
CARRIAGE PREPAID

ORDER FROM
THE MARINE REVIEW PUB. CO.,
39-41 Wade Bldg., CLEVELAND.

WARD MACHINE COMPANY

GENERAL MACHINISTS

C. E. WARD, Mgr.

MARINE WORK A SPECIALTY.

19 Michigan St. Cleveland, O.

John D. Gilchrist, Pres. John Marron, Sec'y.
John A. Flajole, Gen'l Mgr.

THE FOREST CITY BOILER CO.

Marine Work a Specialty.

264 Merwin St. Tel. Main 1886

CLEVELAND, OHIO.

STEEL SHIPS.

THEIR CONSTRUCTION AND MAINTENANCE.

A manual for ship builders, ship superintendents, students and marine engineers.

By Thomas Walton.

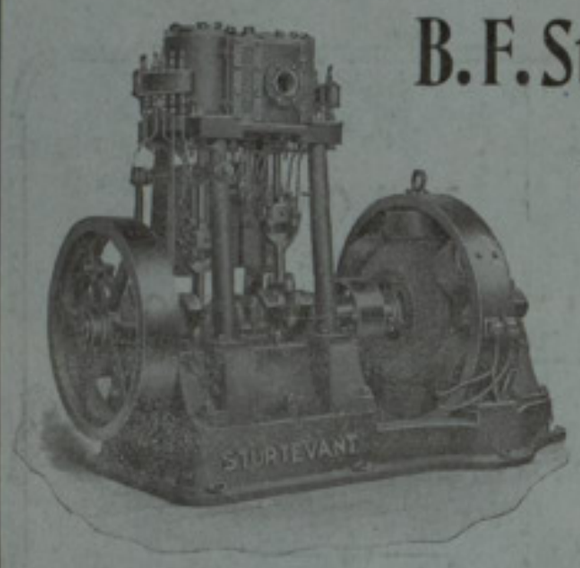
Price $5.50. THE MARINE REVIEW PUB. CO., Cleveland.

MARINE LIGHTING SETS.

We Build Both

Engine and Generator.

Send for Bulletin G.



B. F. Sturtevant Co.

BOSTON, MASS.

NEW YORK.
PHILADELPHIA.
CHICAGO.
LONDON.

(8)

State of Ohio, County of Cuyahoga, } SS.

Good Rope vs. Cheap Rope.

TRIAL NOW ON.

Jurors: **All Vessel Men.**

THE UPSON-WALTON CO.

Are on the side of Good Rope.

What will be your Verdict! . . . . . .

THE MOST COMPLETE STOCK

BRASS and COPPER

in Sheets, Tubes, Wire and Rod.

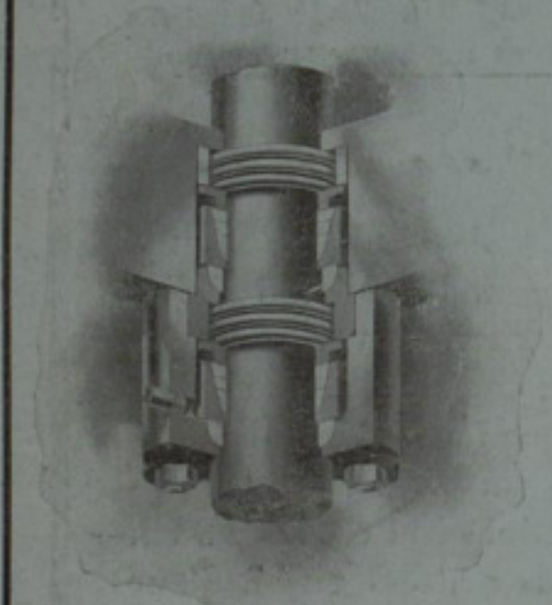
Service Right, Quality Right, Prices Right

Waterbury Brass Co.

122 to 130 Centre St., :: :: :: New York City

Always have our classified Stock List before you

YOURS FOR THE ASKING



Class No. 1 Packing.

United States Metallic Packing Co.

427 NORTH 13TH ST.
PHILADELPHIA, PENN.

SEND FOR CATALOG

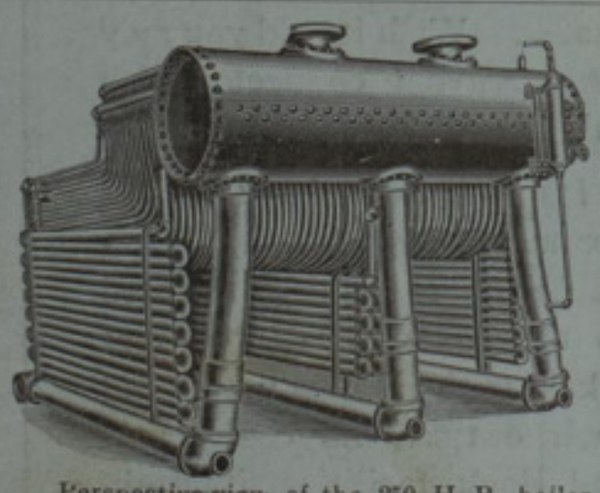
CHICAGO
509 Great Northern Building

CLEVELAND CITY FORGE & IRON CO.



CLEVELAND, O.

IRON OR STEEL FORGINGS FINISHED COMPLETE, ROUGH MACHINED OR SMOOTH FORGED ONLY, OF ANY WEIGHT.
COUPLING LINKS AND PINS. PRESSED WROUGHT IRON TURNBUCKLES. CAR IRON SPECIALTIES.



Perspective view of the 250 H. P. boiler built for the steam freighter "Clara," having 6 ft. space and 8 ft. length; 34.4 sq. ft. of grate area and 1,900 sq. ft. heating surface; weight of boiler and water, 14,000 lbs. Replaced a return tubular boiler, thereby saving in dead-weight of boiler and water, 16½ tons. The Clara now has 14 in. less draft and an increased earning capacity of $10 per day.

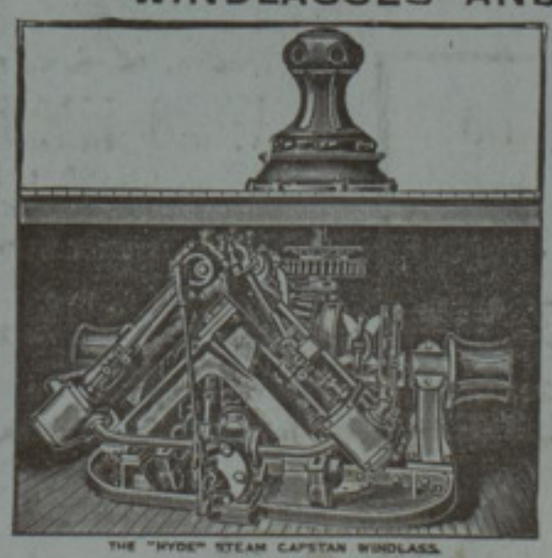
Boyer Sectional Water Tube Boilers are of an entire new design, are simplest in construction, are accessible to all parts, are rapid steamers with short circulation, have low center of gravity, have no joints in the fire, have no dead ends, occupy less space in width, length and height than any other, are easily fired, can be repaired or set up by any ordinary mechanic, do not require a brick casing, and are shipped whole or knocked down into packages for transportation by man or beast.

Kindly mention this paper.

L. BOYER'S SONS,

90 Water Street, : NEW YORK, N. Y.

WINDLASSES AND CAPSTANS



THE "HYDE" STEAM CAPSTAN WINDLASS.

The Hyde Steam and Power Windlasses and Capstans are the best in the market.

They have been selected for most of the vessels now building for the Navy Department, Revenue Marine, Light-house Board and United States Coast Survey.

They are being furnished for the majority of the highest class Steam Ships, Merchant Vessels and Yachts now building.

HYDE WINDLASS COMPANY, : BATH MAINE.

LIFE PRESERVERS—BUOYS.

Acme. Solid Cork. Granulated Cork. Each Preserver stamped by U. S. Inspector guaranteeing proper buoyancy. Cork Filled Yacht Fenders. Cork Mooring Buoys. Material and Finish Guaranteed. Orders filled promptly

ARMSTRONG CORK COMPANY.

Boston. New York. Philadelphia. Pittsburg. Chicago. St. Louis. Baltimore.

Midland Towing and Wrecking Co., Ltd.

MIDLAND, ONT., CANADA.

JAMES PLAYFAIR, { Pres't and Gen. Mngr.
B. L. WHITE, Vice-President.
J. W. BENSON, Sec'y and Treas.

First-Class Tugs for Wrecking, Raft Towing, Etc. Steam Pumps, Divers, Jacks, Hawsers, Lighters.

PROPELLER WHEELS SOLID AND SECTIONAL
AETNA GRATE BARS, TIMBERHEADS, CHOCKS, ETC.

THE MACBETH IRON CO.
CLEVELAND, OHIO
57 WEST CENTER ST.

ENGINEERS FOUNDERS AND MACHINISTS.
HEAVY FORGINGS ENGINE REPAIRS.

18 to 26 TERRACE, BUFFALO, N. Y.

Howard H. Baker & Co., SHIP CHANDLERS AND SAIL MAKERS,

MARINE REVIEW

WEEKLY.] AND MARINE RECORD. [ESTABLISHED, 1878.

VOL. XXVII. CLEVELAND, O., APRIL 30, 1903. No. 18.



Improved Bolt Helmet

Established 1844.

A. SCHRADER'S SON,

32 Rose Street, NEW YORK.

Manufacturer of

Submarine Armor and Diving Apparatus.

We carry a complete stock of Dresses, Hose and Repair Sundries.

All orders filled day received. Write for our prices.

THE WM. CRAMP & SONS SHIP AND ENGINE BUILDING COMPANY.

PHILADELPHIA.

SOLE MANUFACTURERS IN AMERICA OF

Parsons Manganese Bronze and Parsons White Brass.

W. L. BROWN, Pres.
R. L. IRELAND, Vice-President.
R. C. WETMORE, Sec'y. and Treas.
JAS. C. WALLACE, General Manager.

DRY DOCKS IN CLEVELAND.
No. 1, foot Weddell St., 440 ft x 50 ft x 16 ft.
No. 2, foot Weddell St, 300 ft x 55 ft. x 13 ft.
No. 3, Elm St., 340 ft. x 50 ft. x 13 ft.
Dry Dock at Lorain, 560 ft by 60 ft. by 17 ft.

The American Ship Building Co.

OFFICE, 120 VIADUCT, CLEVELAND, O.

STEEL SHIPS

Marine and Stationary Engines.
Boilers and Auxiliary Machinery.

Sole Agents for the Lakes for the Ellis & Eaves Induced Draft System, as applied to boilers, giving increased power and great economy.

Prompt Attention Given to Ship Repairs of all Kinds.

WORKS AT CLEVELAND AND LORAIN.

EDWARD W. HYDE, Pres. H. H. McCARTY, Treas.
JOHN S. HYDE, Vice-Pres. and Gen. Supt.

BATH IRON WORKS, Ltd.

Ship Builders and Engineers.

BATH, MAINE.

The ELECTRO-DYNAMIC CO.

212 to 226 IONIC STREET : : : PHILADELPHIA, PENNA.

CABLE ADDRESS, :: :: :: :: :: :: EDCO. A. B. C. CODE.

— MANUFACTURERS OF —

DYNAMOS, MOTORS, KNIFE SWITCHES, ELECTRICAL STEERING GEARS, ENGINE ROOM TELEGRAPHS, REVOLUTION INDICATORS, and MARINE SPECIALTIES

THE "LONG-ARM" SYSTEM CO., CLEVELAND, O., U. S. A.
ENGINEERS AND MANUFACTURERS

STANDARD INTERCHANGEABLE SHIP--FITTINGS.

Safety, Electric POWER-DOORS and HATCHES, operated on the "Long-Arm" System.

Small, high and low-duty, three-Cylinder AIR COMPRESSORS (light, compact, vertical, electric drive).

Seamless, steel flasks leather packings and special valves.

Water-tight Swing Doors, Sliding Doors and Ship Manholes.

Air Ports, Dead Lights, Deck Lights, Hand Pumps and Magazine Lights.

High-grade electric motors, controllers, motor starters and junction boxes.

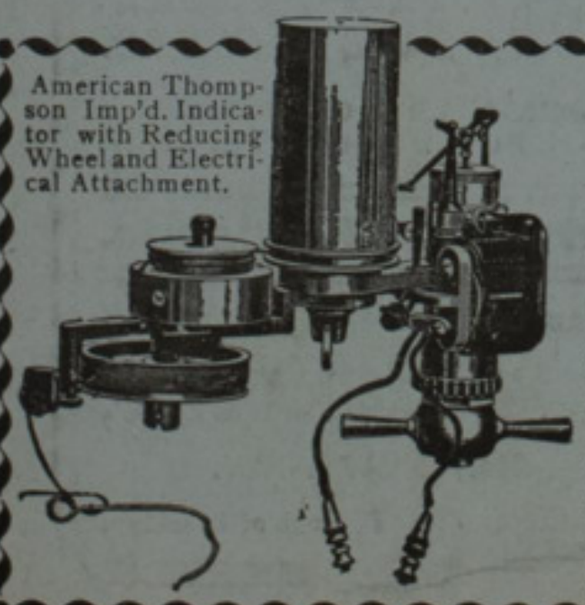
ALEXANDER McVITTIE, President and Manager. CHARLES B. CALDER, General Superintendent. M. E. FARR, Secretary and Treasurer.
WILLIAM C. McMILLAN, Vice-President. FRANK E. KIRBY, Consulting Engineer.

DETROIT SHIPBUILDING COMPANY,

SHIP AND ENGINE BUILDERS, DETROIT, MICH.

Sole Owners for the Lakes and Atlantic Coast of the HOWDEN HOT DRAFT SYSTEM as applied to Boilers, giving increased power and great economy.

Steel Ship Yard Located at Wyandotte, Mich.
Wooden Ship Yards and Dry Docks, Foot of Orleans Street, and Foot of Clark Ave., DETROIT, MICH.



American Thompson Imp'd. Indicator with Reducing Wheel and Electrical Attachment.

American Steam Gauge and Valve Mnf'g. Co.

(Original Steam Gauge Co.)
New York, Boston, Chicago,

Manufacturers of Gauges that Gauge, Indicators that Indicate, Pops that Pop. Clocks, Revolution Counters, Whistles and all kinds of Steamship Instruments. Original and only genuine Thompson Indicator. The Indicator that made Indicators famous. Highest award at the Paris Exposition, 1900. The only American Indicator to receive a medal. The gold medal awarded at Pan-American Exposition on Gauges, Pop Valves, Indicators and Engineering Specialties.

Luck for the 20th Century IN . . . BERTRAM'S OIL & PASTE POLISH.

BERTRAM'S OIL AND PASTE POLISH is and has been, for twenty years, the standard of excellence. As a MARINE POLISH, it has no equal.

Every package, except the 3 and 8 oz. cans, contains one of our "20th CENTURY LUCK COINS."

A sample of BERTRAM'S OIL POLISH mailed free of charge, on request.

BERTRAM'S OIL POLISH CO.,
BOSTON, MASS.

THE BROWN HOISTING MACHINERY CO. INCORPORATED

Sole makers of the "Brownhoist" High Speed Cantilever and Gantry Cranes. The most economical cranes for covering large areas in steel works or ship yards.

Machinery For Handling
Structural Work, Marine Plates, etc., in Ship Building Yards.

Coal and Ore Handling Machinery.

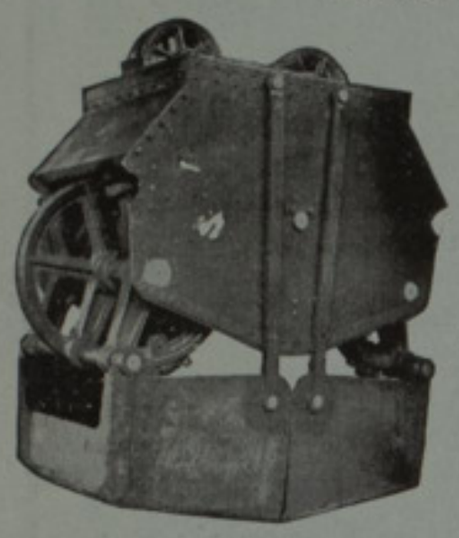
Cranes of all Types.
Steam, Electric and Hand Power.

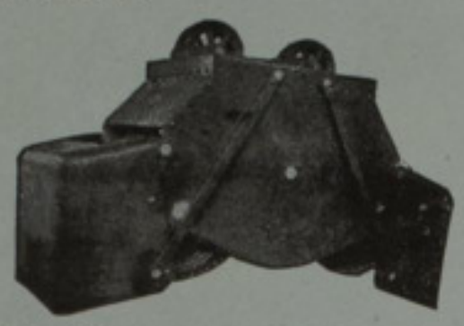
Main Office and Works, CLEVELAND, O., U. S. A.

Eastern Office, 26 Cortlandt St., New York City. Pittsburg Office, Carnegie Building, Pittsburg, Pa, European Office, 39 Victoria St., London, S.W.

"CLAM SHELL" BUCKETS FOR IRON ORE.

HULETT PATENTS





The Webster, Camp & Lane Co.
BUILDERS.

Complete Coal and Ore Handling Plants.

Engineering Office CLEVELAND, O., Main Office & Works AKRON, O.



We have now fitted up three fueling scows which are now in successful operation on the lakes for fueling vessels.

Send for full description.

Questions and Answers for Marine Engineers.
By Theo. Lucas.
Sent postpaid to any address for $2.00.
Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland, O.

GENERATORS — ELWELL-PARKER ELECTRIC CO. OF AMERICA MANUFACTURERS GUARANTEES QUALITY CLEVELAND, OHIO. — MOTORS

Standard Marine Generating Sets. Complete Hoisting and Power Plants.

Established 1857.

AMERICAN SHIP WINDLASS CO.

PROVIDENCE, R. I.

SHIP MACHINERY EMBODYING THE LATEST DESIGNS AND MANY IMPORTANT PATENTED IMPROVEMENTS.

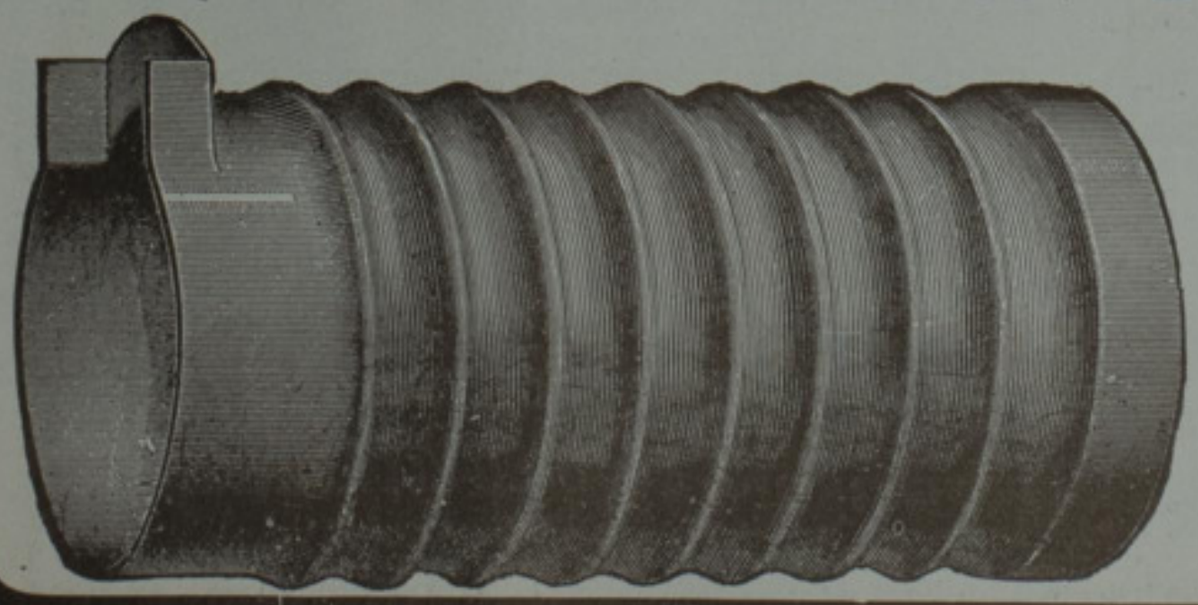
SOLE BUILDERS OF THE

Original and Only Automatic Steam Towing Machine.

SEND FOR ILLUSTRATED CATALOGUE.

P. O. BOX 53. Address: FRANK S. MANTON, President.

MORISON SUSPENSION BOILER FURNACES



FOR LAND AND MARINE BOILERS.

UNIFORM THICKNESS—EASILY CLEANED
UNEXCELLED FOR STRENGTH.

Also Fox Corrugated Furnaces.

MANUFACTURED BY

THE CONTINENTAL IRON WORKS,

West and Calyer Sts., NEW YORK.

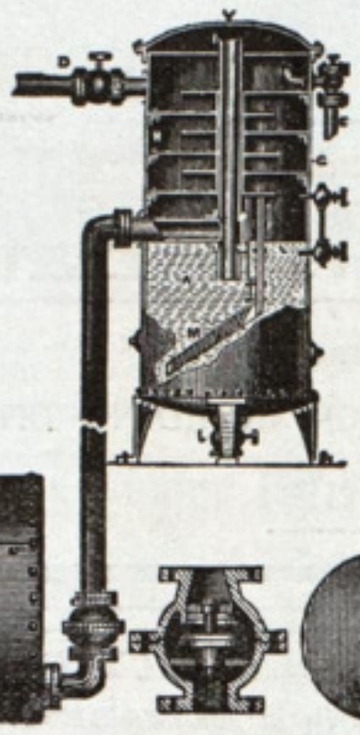
Near 10th and 23d Sts. Ferries. Borough of Brooklyn.

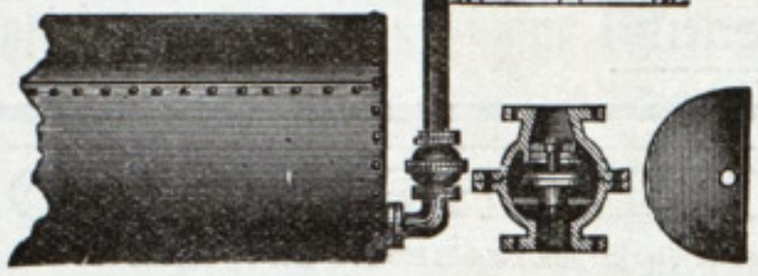
Keep Your Boilers Clean

By Using CLEAN WATER.

The "BUFFALO" is Warranted to Remove all Sediment and Scale Forming Substance.

THE BUFFALO FEED WATER HEATER AND PURIFIER.



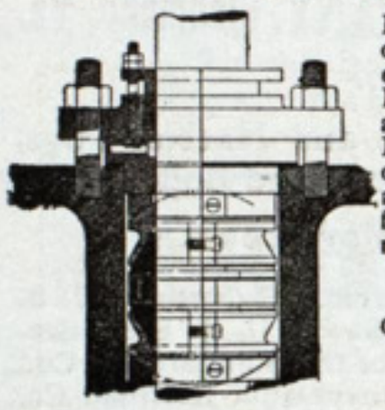


The undersigned has the agency of a number of meritorious steam specialties for use on steam vessels, all of which are guaranteed to be what they are represented, and which he is prepared to furnish at a low rate. I am also prepared to superintend the making of alterations and repairs on steam vessels or power plants, at a reasonable cost, and would respectfully solicit your patronage, to which prompt and personal attention will be given.

ROBERT LEARMONTH, Patentee,

100 WHITE BUILDING, BUFFALO, N. Y.

KATZENSTEIN'S Self-Acting METAL PACKING.



For PISTON RODS, VALVE STEMS, etc., of every description for Steam Engines, Pumps, etc., etc. Adopted and in use by the principal Iron Works and Steamship Companies in this and foreign countries. FLEXIBLE TUBULAR METALLIC PACKING, for slip-joints on Steam Pipes, and for Hydraulic Pressure; also METAL GASKETS for all kinds of flanges and joints. For full particulars and reference, address:

L. KATZENSTEIN & CO.,

General Machinists, Brass Finishers, Engineers' Supplies,

358 WEST ST., NEW YORK.

H. A. J. HELVIG.

MANUFACTURER OF

SHIP LANTERNS and LAMPS.



Carried in stock by the leading ship chandlers, who are in a position to make prompt delivery at bottom prices, also

Side Lights, Bow Lights,
Anchor Lights, Launch Lights,
Binnacle Lamps, Cabin Lamps,
Hand Lamps, Etc.

228 PEARL STREET, NEW YORK.

British Admiralty Charts

The latest Editions of Charts, Plans and Sailing Directions Published by the British Admiralty. Can be obtained from Admiralty Agent by Appointment.

J. D. POTTER,

145 MINORIES, LONDON, ENGLAND.

OFFICIAL CATALOGUE OF CHARTS (380 pages) 1s.

An Abridged Catalogue of Charts of Nautical Books (free on application.)

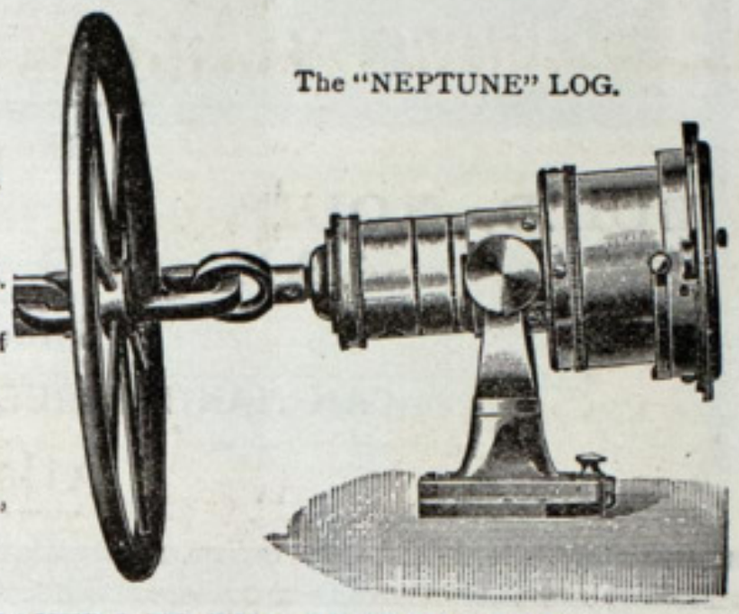
THOMAS WALKER & SON,

BIRMINGHAM, ENGLAND.

THE "NEPTUNE" SHIP-LOG With Ball Bearings for HIGH SPEEDS.

Also makers of the "CHERUB" and "HARPOON" SHIP-LOGS.

The "NEPTUNE" LOG.



MAKERS TO THE BRITISH NAVY.

NICHOLSON DISTANCE OR RANGE FINDER



Advantages claimed for this device are: FIRST, no mathematical calculation whatsoever. SECOND, the distance the vessel will be out from the object observed, when abreast, is obtained some time before coming abreast. THIRD, the distance the ship will have to sail to get abreast, and the distance in a straight line to the object are instantly found. FOURTH, simplicity, durability and accuracy. It is so simple that anyone not a mathematician can readily learn to use it. There is nothing to get out of order and its accuracy is self evident. Every ship master and pilot should have one.

Circular upon Application. Manufactured by

NICHOLSON SHIP LOG CO.

204 Superior Street, Cleveland, Ohio, U. S. A.

Steel Works and Rolling Mill Engineers

Garrett-Cromwell Engineering Co.

WILLIAM GARRETT, Manager.

New England Building, Cleveland, O.

STEEL SHIPS

THEIR CONSTRUCTION AND MAINTENANCE.

A manual for ship builders, ship superintendents, students and marine engineers. By Thos. Walton.

Price $5.50.

THE MARINE REVIEW PUB. CO., CLEVELAND.

Pintsch Gas Lighted Buoys

Adopted by the English, German, French, Russian and United States Light House Departments for Channel and Harbor Lighting; over 1000 gas buoys and gas beacons in service.

Burn Continuously

from 80 to 365 days and nights without attention, and can be seen a distance of six miles.

Brilliant and Steady Illumination.
Economical and Reliable in Operation.

Controlled by the SAFETY CAR HEATING and LIGHTING CO.
160 Broadway, New York City.

The United States Shipbuilding Company

43 Cedar Street, New York

Builders of all Types of Vessels

The only Company in the world that can

BUILD, EQUIP, ARM AND ARMOR **A Modern Battleship**

without calling upon outside assistance

CAN MAKE AGREEMENTS COVERING REPAIRS OR BUILDING ON

Atlantic and Pacific Oceans

Mathias Seddinger, President.
Sommers N. Smith, Vice Pres't. and Gen'l Mgr. ESTABLISHED 1838

The Neafie & Levy Ship & Engine Building Company.

Penn Works.

Iron and Steel Ship and Marine Engine

BUILDERS.

Sole Makers of the Well Known

PHILADELPHIA PROPELLER WHEEL.

Beach and Palmer Streets. Philadelphia, Pa., U. S. A.

CRESCENT SHIP YARD CO.

Office and Works: ***ELIZABETHPORT, N. J.***

Builders of Stern-Wheel, Paddle and Screw Steamers; also Torpedo Boats and Barges of all kinds in Steel.

A Specialty made of South American and Alaskan River Boats.

W. & A. FLETCHER CO.

NORTH RIVER IRON WORKS.

MARINE ENGINES, BOILERS, Etc.

Hudson, 12th and 14th Streets, Hoboken, N. J.

Take Ferry from foot of West 14th St., N. Y.

WILLIAM R. TRIGG COMPANY, Richmond, Va.

BUILDERS OF

Steamships, Steamboats, Ocean and Harbor Tugs, Steel Barges, Marine Engines and Boilers.

REPAIRS TO ALL CLASSES OF VESSELS.

NOW BUILDING:—U. S. Cruiser Galveston, U. S. Revenue Cutters Tuscarora and Mohawk, U. S. Steel Seagoing Dredge, Steel Tank Steamer for the Standard Oil Co., and several large Tugs for the Pennsylvania Railroad Co. and the New York, Philadelphia & Norfolk Railroad Co.

FALLS HOLLOW STAYBOLTS,

ANY SIZE, OUTSIDE OR INSIDE DIAMETER.
AVERAGE LENGTH OF HOLLOW BARS EIGHT TO TEN FEET.

FALLS HOLLOW STAYBOLT Co

BOTH HOLLOW AND SOLID,
MADE OF BEST QUALITY DOUBLE REFINED CHARCOAL IRON OR STEEL. CUYAHOGA FALLS, O. U.S.A.

Guaranteed to pass U. S. Government or Railway Companies' Specifications and Inspection. Samples furnished on application. Our latest prices will interest you.

Neversink Cork Jackets and Life Belt.

Warranted 24 pounds. Buoyancy and full weight of Cork, as required by U. S. Inspectors.

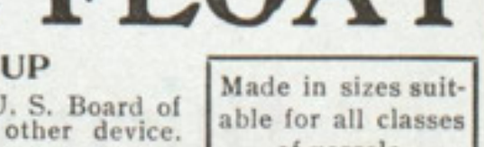
Consolidated Cork Life Preservers. Ring Buoys and Fenders.

SAFEST. CHEAPEST.

Approved and adopted by U. S. Board of Supervising Inspectors. Also adopted by the principal Ocean, Lake and River Steamer Lines as the only Reliable Life Preserver. Awarded four Medals by World's Columbian Exposition.



METALLIC and WOODEN LIFE BOATS.



Metallic Life Rafts. Marine Drags.

Manufacturers of Woolsey's Patent Life Buoy—the lightest, cheapest and most compact life raft known.

DAVID KAHNWEILER'S SONS.
437 Pearl Street, New York City.
Send for Illustrated Catalogue.

PATTERSON'S NAUTICAL ENCYCLOPEDIA. PRICE, $3.00

Is in all respects a work up to date, correct as to every term known to the shipping world. Sent upon approval. Carriage prepaid.

THE MARINE REVIEW PUB. CO., CLEVELAND.

CRANE VALVES

ESTABLISHED 1855

THOS. DREIN & SON,

TATNALL ST. BELOW RAILROAD, WILMINGTON, DEL.



BUILDERS OF METALLIC LIFE BOATS AND RAFTS, YACHTS AND PLEASURE BOATS.

LIFE PRESERVERS.

OUTFIT FOR LAKE STEAMERS A SPECIALTY.



Phone Call 340 B. Greenpoint.

LANE & DeGROOT.

METALLIC LIFE BOATS.
(Formerly Raymond's)

Metallic Life Rafts, Cork Life Preservers, etc., approved by the U. S. Supervising Inspectors. Also Wood Boats of every description. Repairing of every kind promptly attended to.

305-315 Vernon Ave., Long Island City, N. Y.

Indestructible,
Non-Sinkable,
Non-Capsizable,
Non-Collapsible.



CARLEY LIFE FLOAT

VERY LIGHT AND ALWAYS RIGHT SIDE UP

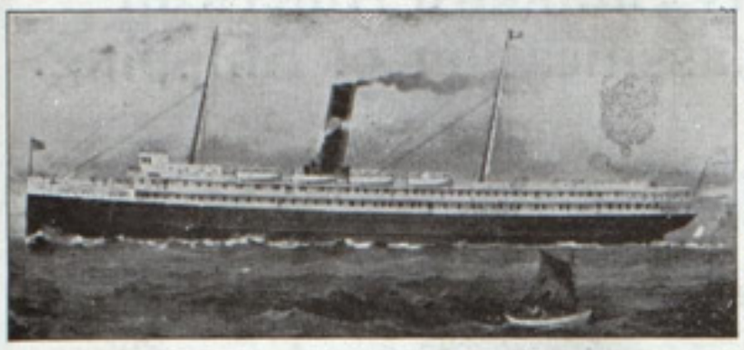
Adopted by the U. S. Navy and approved and recommended by the U. S. Board of Supervising Inspectors, who allow it a greater rating than any other device.

Made in sizes suitable for all classes of vessels.

CARLEY LIFE FLOAT COMPANY.

NEW YORK—F. 4 and 5 Produce Exc. Telephone, 2783 Broad.
PHILADELPHIA—914 Betz Building,
BOSTON—330 Washington Street.
Send for Catalogue
FACTORY—CAMBRIDGEPORT, MASS.

ROACH'S SHIP YARD.



Delaware River Iron Ship-Building & Engine Works Chester, Pa.

Builders of Steamships and Marine Machinery.

SHIP-BUILDING IN ALL ITS BRANCHES.

NEW YORK OFFICE, MORGAN IRON WORKS Foot E. Ninth St.

Fore River Ship and Engine Co.

Successors to Fore River Engine Co.

Steel Ship and Marine Engine Builders.

CONTRACTORS FOR

U. S. Torpedo Boat Destroyers Lawrence and Macdonough.
U. S. Protected Cruiser Des Moines.
U. S. Battleships New Jersey and Rhode Island.
U. S. Steam Light-Vessel No. 72.

OFFICE AND WORKS, QUINCY, MASS. U. S. A.

The Atlantic Works,

Builders .... of Steamships, Steam Yachts, Tow Boats Etc

EAST BOSTON MASS.

Marine Engines, Boilers and Tanks.
Heavy Machinery and Plate Iron Work
Three Marine Railways.

MARYLAND STEEL CO.

Marine Department,

Ship Builders and Engineers

SPARROW'S POINT, MD.

Baltimore Telephone No. 11 - - - A. G. WILSON, Manager.
Long Distance Telephone Service Between New York, Philadelphia, Boston and Sparrow's Point Offices.
New York Office: 71 Broadway. Boston Office: 70 Kilby Street.
Philadelphia Office: 312-319 Girard Building.

Risdon Iron Works,

IRON and STEEL SHIP BUILDERS

WORKS AT POTRERO, SAN FRANCISCO.

Office and Branch Works. Steuart and Folsom Streets
SAN FRANCISCO.

THE LOCKWOOD MANUFACTURING CO.

EAST BOSTON, MASS.

ENGINEERS AND MACHINISTS.

Builders of STEAMSHIPS, TOW BOATS and MARINE ENGINES
REPAIRING OF HULLS AND MACHINERY.

The Allen Dense-Air Ice Machine

Contains no chemicals, only air. Proven by many years' service in the tropics on United States men-of-war, steam yachts and passenger steamers.

A HUNDRED ARE IN DAILY SERVICE ON STEAMERS.

H. B. ROELKER, 41 Maiden Lane, NEW YORK

Consulting and Constructing Engineer. Designer and Manufacturer of Screw Propellers.

J. E. BOTSFORD, President — C. O. DUNCAN, Vice President — F. D. JENKS, Sec'y & Treas.

COLUMBIA IRON WORKS

STEEL SHIP BUILDERS

MARINE ENGINES BOILERS AUXILIARY MACHINERY

ALL KINDS OF REPAIR WORK

PLANT, ST. CLAIR, MICH. OFFICE, PORT HURON, MICH.

MANITOWOC DRY DOCK COMPANY

SHIP BUILDERS

Facilities for Repairs to Steel and Wooden Vessels.

DRY DOCKS AND MAIN OFFICE: MANITOWOC, WIS.
BRANCH YARD: 34 ROBERTS STREET, CHICAGO.

WARRINGTON IRON WORKS,

Builders of STEAM YACHTS, TOW BOATS and LAUNCHES.

Marine Engines, Boilers and Tanks.
Heavy Machinery and Plate Iron Works.

Foot of West Wellington St., CHICAGO, ILLINOIS.

Newport News Shipbuilding AND Dry Dock Co.

SHIP and ENGINE BUILDERS.

Equipped with two large basin dry docks of the following dimensions:

	No 1	No 2
Length on top	610 ft	827 ft
Width on top	130 ft	162 ft
Width on bottom	50 ft	80 ft
Draught of water over sill	25 ft	30 ft

Shops are equipped with modern machinery capable of doing the largest work required in ship construction.

Tools driven by electricity and compressed air used in constructing and repairing vessels.

For estimates and further particulars, address

C. B. ORCUTT, President.

No. 1 BROADWAY, NEW YORK.

Works at Newport News, Va. (On Hampton Roads.)

The Pusey & Jones Company,

WILMINGTON, DELAWARE.

BUILDERS OF Iron and Steel Steamers, Steam Yachts, Tow Boats, Marine Engines, Boilers, Tanks, and of Heavy Machinery Generally.

ALSO COPPERSMITH WORK.

Special Facilities for REPAIRS to both WOODEN and METAL Boats

MARINE RAILWAY. NO WHARFAGE CHARGED.

RALPH DERR, Treas. — *H. NEWTON, WHITTELSEY, Pres.* — *JAMES SWAN, Consult. N. A.*
HAROLD LEE, Secy. — *F. S. BRINTON, Constructor*

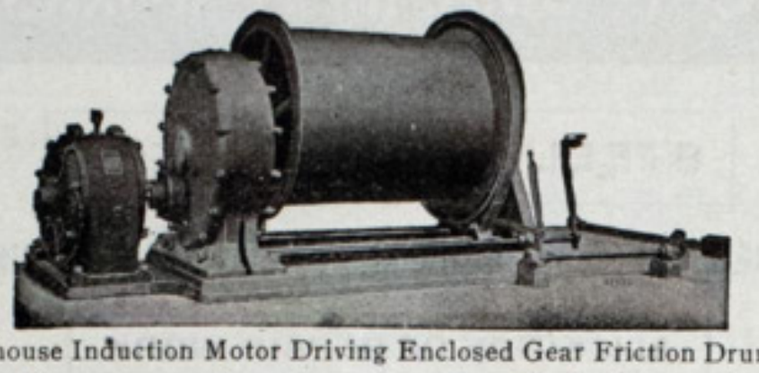
MARINE CONSTRUCTION AND DRY DOCK COMPANY of New York

Steel and Wood Vessels, Yachts, Tugs, Life Boats and Tenders.

Send Specifications and enquiry to—Works: Mariner Harbor, (S. I.) N. Y.
Telephone, 133 West Brighton.

New York Office, 1023 Maritime Building.
Telephone, 3404 Broad.

Westinghouse Induction Motors



Westinghouse Induction Motor Driving Enclosed Gear Friction Drum Hoist

Adaptable to any class of work and will do the work more economically and efficiently than by any other method.

Circular 1050 gives particulars.

Westinghouse Electric & Mfg. Co.

Pittsburg, Pa.

Sales Offices in Every Large City.



MacLean Hydraulic Signal

Best Engine Room Telegraph.

Simple, Powerful, Easily Operated, Sure and Reliable. Last Signal recorded if engineer misunderstands or does not obey signal promptly.

Will not get out of order and needs no readjustment after installing. Can be easily installed. We have whistle and steering signals also for use at either end of the boat; extremely useful and convenient when backing down. For full particulars and illustrations address:

MacLean Hydraulic Signal Co.

317-318 Manhattan Building, CHICAGO.

Buffalo

Wrought Steel Ranges

Are the Best.

Steamboat and Barge Ranges with Rotary Grates.
No Cog Wheels to Warp or get out of order.

Don't take our word for it but ask some one using them.

Russell & Watson, BUFFALO, N. Y.

General Steamboat Work Send for Catalogue.

AGENTS—Topky Bros., Ashtabula Harbor, Ohio.
H. C. Weber & Co., Detroit, Mich.
John Black, So. Chicago, Ill.
Pritzlaff Bros., Milwaukee, Wis.

LIDGERWOOD HOISTING ENGINES

OVER 21,000 IN USE.



Lidgerwood Electric Hoist

ELECTRIC HOISTS

Specially adapted for Docks, Warehouses and Steamships.

LIDGERWOOD MILLER MARINE CABLEWAY

will transfer Coal, Ammunition Supplies, etc. from ship to ship at sea.

SEND FOR CATALOGUE.

LIDGERWOOD MFG. CO. 96 LIBERTY STREET, NEW YORK.

Photographs of Ships, Docks, Etc.

We have a pretty thorough list of active vessels, of docks, elevators, coal and ore handling machinery, etc.

The price at which we furnish photographs is very low. If you are interested call or write.

THE MARINE REVIEW PUBLISHING CO.,
39-41 Wade Building, Cleveland.

The Only Standard American Classification of Shipping.

RECORD OF AMERICAN AND FOREIGN SHIPPING. ESTABLISHED 1867. PUBLISHED BY American Bureau of Shipping, New York.

Has Authorized Agents in all the principal ports of the world to protect the interests of its patrons. Vessels built under its rules, or holding certificates of class in this Record of Shipping will, with their Cargoes, insure at lowest rates. Office, 66 Beaver Street, New York.

A. A. RAVEN, President. W. R. T. JONES, Vice President,
W. H. H. MOORE, Treasurer. W. IRVING COMES, Secretary.

SHEPARD'S HORSE POWER SCALE

FOR DETERMINING

HORSE POWER,
SIZE OF CYLINDERS,
DENSITY, TEMPERATURE,
LATENT HEAT OF STEAM.

Has sold in great numbers at $1 each.

OFFERED AS A PREMIUM WITH ONE YEAR'S SUBSCRIPTION TO THE MARINE REVIEW AND MARINE RECORD AT $3.00.



Geo. Stratford Oakum Co.

JERSEY CITY, N. J.

ESTABLISHED 1860

Manufacturers of all grades of

OAKUM.

Spun Cotton.

For sale at Ship Chandlers everywhere.

MARINE CHAIN

OF ALL KINDS.

Ships Cables, Dredge Chains,
Stud Link and Marine Railway Chains,
Steam Shovel Chains, Boom Chains, Etc.

CERTIFICATE OF TEST FURNISHED.

STANDARD CHAIN CO.

PITTSBURGH, PA.

The Ideal Pigment

TRADE MARK

FEROX

REGISTERED JULY 8, 1902



The only adequate protection for Ships, Bridges and Structural Iron and Steel Work.

Mohawk Paint & Chemical Co.

SOLE MANUFACTURERS OF

Patent Iron Oxide Paints

98% Pure

19 Liberty Street, New York.

The only **Pure** Iron Oxide Paint.
The only Non-Crystalline Oxide of Iron.

Being porous and spongy it absorbs and retains the oil and makes a permanent, durable, unchanging, protective coating for wood and metals.

It is rust-proof and not subject to chemical action.
Unequalled for submarine use.

SEND FOR DESCRIPTIVE CIRCULAR.

Chas. E. & W. F. Peck

ESTABLISHED 1870

58 William Street, New York City.
Royal Insurance Building, Chicago, Ill.

C. T. BOWRING & CO., Ltd.
5 and 6 Billiter Ave., LONDON, E. C., ENGLAND,
AND AT "LLOYDS," LONDON.

Insurance Brokers

As brokers we represent ONLY THE ASSURED. Our clients being the VESSEL OWNERS, we refuse to represent insurance companies. We place insurances in the most advantageous market at the best procurable rates and terms. We leave it to the managers and general agents of insurance companies to protect the interests of their companies, maintaining that it is impossible for us to devote ourselves to the interest of both the owners and the insurance companies at the same time.

Average Adjusting Department

Williamson Building. Cleveland, Ohio.

GREAT LAKES REGISTER.

INCORPORATED.

Combined and Issued in Connection with the

BUREAU VERITAS

INTERNATIONAL REGISTER OF SHIPPING.

Great Lakes Register desires to announce that its ratings go before the leading Underwriters of America, England and France.

THE SERVICES OF ITS SURVEYORS MAY BE ENGAGED ON HULL AND CARGOES

F. D. HERRIMAN, SURVEYOR GENERAL,

320-322 Perry-Payne Building, - - CLEVELAND. O,

CRANE FITTINGS

ESTABLISHED 1855

Why Argue with the Convinced?

All ship builders and marine painters know that

ZINC WHITE

is the only available white paint for their use.

FREE—Our practical Pamphlets:

"Paints in Architecture,"

"The Paint Question,"

"French Government Decrees."

THE NEW JERSEY ZINC CO.,

11 Broadway, New York.

INSURANCE

Geo. L. McCurdy,
169 Jackson Boulevard,
Chicago, - - Illinois.

Direct Representative of Leading American and Foreign Underwriters.

HULLS AND CARGOES.

INSURANCE COMPANY OF NORTH AMERICA.

232 Walnut Street, :: PHILADELPHIA :: Founded A. D. 1792
Fire, Marine and Inland Insurance. Charter Perpetual.

CAPITAL STOCK	$3,000,000.00
Reserve for Reinsurance	4,868,952.10
Reserve for unadjusted losses and other liabilities	845,042.46
Surplus over liabilities	1,988,589.05
Total Assets, January 1, 1902	10,702,583.61

This Company issues certificates of insurance, payable in cases of loss at the option of the assured, in London, Paris, Antwerp, Bremen, Hamburg, Amsterdam, Japan, China and Australia.

CHARLES PLATT, President HENRY W. FARNUM, Marine Secy.

The Donnelly Salvage and Wrecking Co., Ltd.,

JOHN DONNELLY, SR., Pres.
JOHN DONNELLY, JR., Vice-Pres.
H. B. FOLGER, Treas.
THOS. DONNELLY. Secy.

KINGSTON ONT.

DIVERS, STEAM PUMPS, TUGS, Etc.

SUPPLIED ON SHORTEST NOTICE.

THE L. P. & J. A. SMITH CO.

CONTRACTORS FOR PUBLIC WORKS

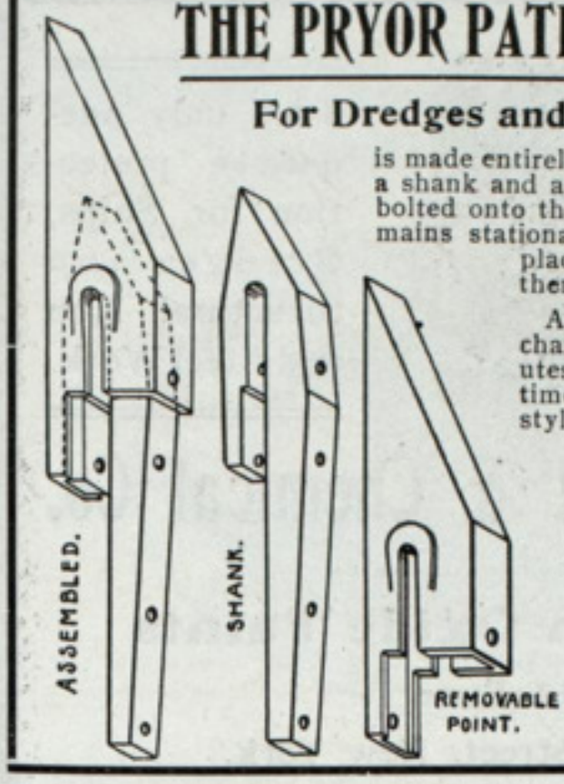
Dredging,
Harbor Work,
Pile Driving,
Breakwaters,
Dry Docks and
Pier Building.

Railroads,
Canals,
Bridges,
Submarine
Foundations,
Etc., Etc.

Offices: Williamson Bldg., Cleveland, O.

THE PRYOR PATENT DIPPER TOOTH

For Dredges and Steam Excavators.



is made entirely of open-hearth steel in two parts, a shank and a removable point. The shank is bolted onto the dipper in the usual way and remains stationary, while the removable point is placed over the shank and is bolted thereto.

A full set of four points can be changed in from ten to fifteen minutes, whereas it takes a much longer time to change a full set of the old-style cumbersome iron teeth. These teeth will wear 100 per cent. longer than the iron teeth, steel tipped, and will increase capacity of the dredge materially in hard digging.

The Pryor Patent Excavator Tooth Co.,
HOUGHTON, MICH.

NAVIGATION SIMPLIFIED.

Not an elaborate technical work—just an assistant for the seaman and a book of valuable plain instruction for beginners.

Contains problems required in examinations that are given by government inspectors to masters and mates of sea-going vessels.

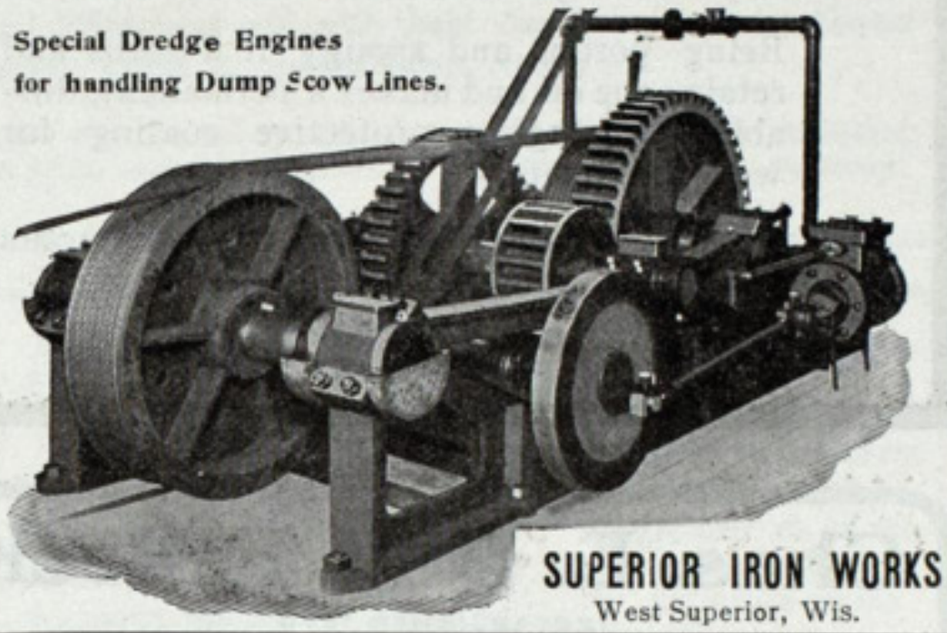
Published by C. E. MacArthur.

CLOTH BINDING, $1.25. PAPER BINDING, $1.00.

THE MARINE REVIEW PUB. CO., 39-41 WADE BLDG., CLEVELAND, O.

CAR HAULAGE ENGINES

Special Dredge Engines
for handling Dump Scow Lines.



SUPERIOR IRON WORKS
West Superior, Wis.

ESTABLISHED 1854



SHERIFFS' STEAM STEERER

For Tug Boat Use

Easy to adjust, and can be handled by any one.

MANUFACTURED BY
SHERIFFS MFG. CO.,
Milwaukee, Wis.

H. G. TROUT,
KING IRON WORKS,
BUFFALO, N. Y.



Manufacturers of

Triple Expansion, Fore-and-Aft

AND

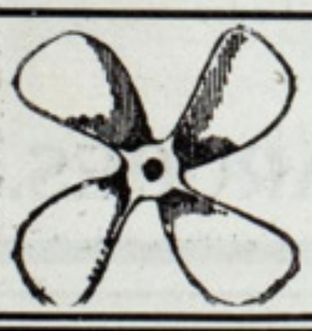
Steeple-Compound Marine Engines,

High and Low Pressure Engines, Sectional Propellers, Tug and Yacht Wheels.....

Cowles' Aluminum and Manganese Bronze Propeller Wheels.

These wheels are noted for their extra speed, towing power and proportionate saving of coal.

PRICES QUOTED ON APPLICATION.



MacKinnon Manufacturing Co.

Boiler Makers, Founders and Machinists.

Marine Boilers, Engines and Shipyard Machinery, Most powerful set of Hydraulic Slings on the lakes. Best towing and speed Propeller Wheels made.

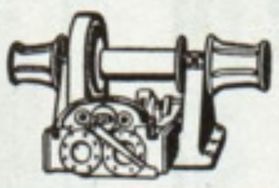
SPECIALTY SMALL YACHT WHEELS.

Works & Office, 224-230 N. Water St., BAY CITY, MICH



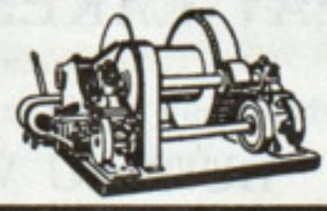
GASOLENE MARINE ENGINES

Suitable for all Boats from 3½ to 200 H.P.
Over 100 in successful use.
Also the well known and always reliable Wootters Gas or Gasolene Stationary Engines.



HOISTING ENGINES

Of all kinds and sizes, and for all purposes, especially for ship use.
Docking and Hauling Engines and Wire Rope Windlasses.



AUTOMATIC TOWING MACHINES

Somewhat the cheapest, and altogether the best. Positively guaranteed.
Automatic Fog Whistle Machines
Steam Steering Engines.

FOR THESE AND OTHER WELL KNOWN SPECIALTIES ADDRESS ALL INQUIRIES TO.

THE CHASE MACHINE CO. Engineers and Machinists, CLEVELAND, OHIO.

The Martin-Barriss Co.

IMPORTERS AND MANUFACTURERS OF

Mahogany, White Mahogany,

AND ALL NATIVE CABINET WOODS.

HIGH GRADES OF KILN DRIED WOODS FOR CABIN WORK AND INSIDE TRIM.

White Oak Timbers and Plank

CONSTANTLY ON HAND AND SAWED TO ORDER ON SHORT NOTICE.

654 Seneca Street, Cleveland, O.

AIDS TO NAVIGATION

are of vital importance to vessel interests.

SCHERZER ROLLING LIFT BRIDGES

aid navigation and meet with the approval of all vessel interests, because of the wide and unobstructed channel provided for navigation, enabling vessels to pass easily and rapidly through the draw.

THE SCHERZER ROLLING LIFT BRIDGE CO.,

MAIN OFFICES: 1616 MONADNOCK BLOCK,

CHICAGO, U. S. A.

All of the latest and largest LAKE STEAMSHIPS are completely equipped with **BLAKE**

DUPLEX AND SIMPLEX SPECIAL MARINE PUMPS.

New Marine Catalog ready about July 1st.

Geo. F. Blake Mfg. Co.

114 Liberty St., :: :: :: NEW YORK CITY.

LATEST PATENT ANCHOR

THE NATIONAL

APPROVED BY LLOYDS.

Manufactured by

L. M. BOWERS & CO.,

Binghamton, N. Y.

Catalogue on Application.



The National and International

ANCHORS.

Furnished to the Lake Trade by

The Upson-Walton Co.,

CLEVELAND, O.



SMOOTH-ON

TRADE MARK

IRON CEMENT No. 1.

Unequalled for repairing leaks or fractures in steam or hydraulic work. This cement is a metallic composition which upon being mixed with water becomes a hard metallic iron that will withstand Steam, Water, Fire or Oil, and expands and contracts the same as iron, which makes it invaluable for boiler patching, making flanged joints, stopping leaking boiler seams, etc. Joints easily taken apart.

Write for free 60 page Illustrated Book.

Smooth-On is for sale by leading supply houses, and is sold in 5, 10 and 25 pound tins.

SMOOTH-ON MFG. CO.

572-574 Communipaw Avenue,

JERSEY CITY, N. J., U. S. A.

De Grauw, Aymar & Company.

ESTABLISHED 1827.

Cordage, Oakum, Vessel and Railroad Supplies.

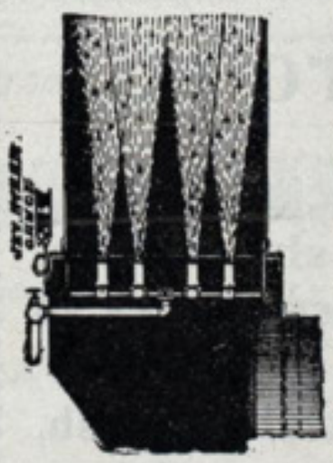
SOLE MANUFACTURERS IN THE UNITED STATES FOR

TYZACK'S STOCKLESS ANCHORS.

NEW YORK CITY.

The Improved Annular Steam Jet.

FOR INDUCED DRAFT.



POWERFUL, ECONOMICAL. 15 to 25% increase in power.

Cut on right shows section of Jet Castings which are attached to spider in stack, as shown in cut on left.

Standard Jet gives between ¾" and 1⅛" draft in stack,

With Hoods gives between 1" and 1½" draft in stack.

With Reducer and Dampers gives between 1¾" and 2½" draft in stack.

REQUIRES NO ATTENTION. ALWAYS READY FOR USE.



67 JETS IN USE.

H. BLOOMSBURG & CO.,

700 DOLPHIN STREET, BALTIMORE, MD.

One of these binders, that will hold a complete volume of the

Marine Review

and Marine Record,

will be mailed to any address on receipt of

$1.

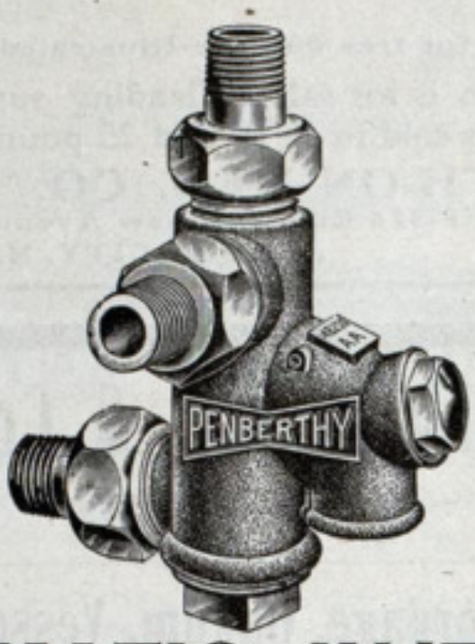


THE MARINE REVIEW PUB. CO., 39-41 Wade Bldg. CLEVELAND, O.

Reason No. One

FOR THE SUCCESS OF THE

TRADE PENBERTHY MARK.



AUTOMATIC INJECTOR

SIMPLICITY OF CONSTRUCTION.—It has but few working parts, all of which can be easily removed for cleaning or can be replaced at slight expense when worn. : : : : : : : :

THE IDEAL MARINE INJECTOR

PENBERTHY INJECTOR CO. 346-364 Holden Ave. DETROIT, MICH.

Largest Injector manufacturers in the world.

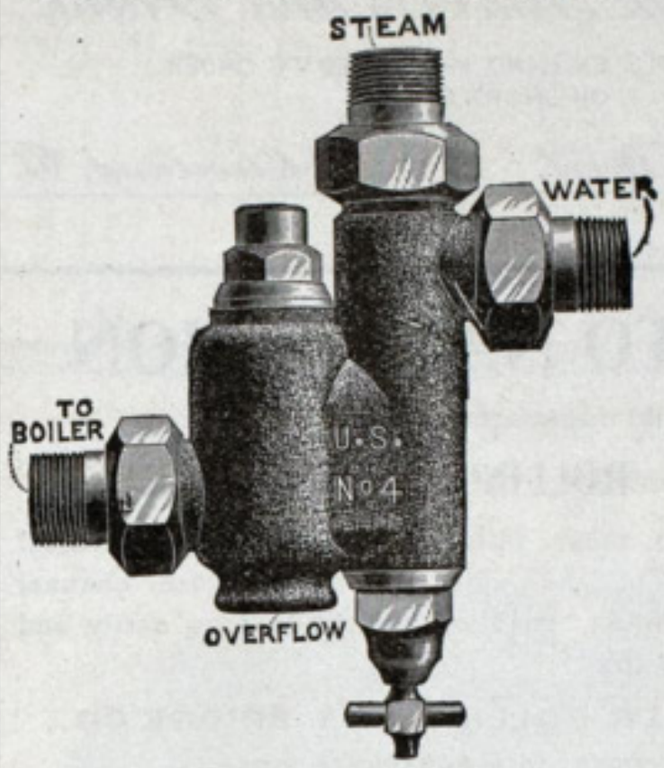
THE ONLY INJECTOR

to use on a marine boiler is the

U. S. Automatic Injector

For instance:

In a storm the rolling of the boat may throw the seacock out of the water, and the boiler supply will cease.



With the ordinary injector the steam will blow back into the suction pipe, a very serious trouble when it occurs, but with the

U. S. Automatic Injector

there is no danger of steam blowing back, and as soon as the suction pipe is under water again the Injector will start work without any attention at all.

Do you see the point?

Send for our "Engineers' Red Book." It contains a lot of information of use to your engineer.

American Injector Co.,

DETROIT, MICH.

Cabins and Staterooms

of modern vessels, especially those in the passenger service, should demonstrate the supreme possibilities of the wood finisher's art.

This demands a special varnish, however, as atmospheric conditions are more destructive to varnish afloat than ashore and the ordinary article is of but little use.

The varnish best adapted to withstand the deleterious influences of wind, wave and weather is "BERRY BROTHERS' SPAR VARNISH."

Further particulars and a unique marine puzzle sent free for the asking. Write us.

Berry Brothers, Limited,

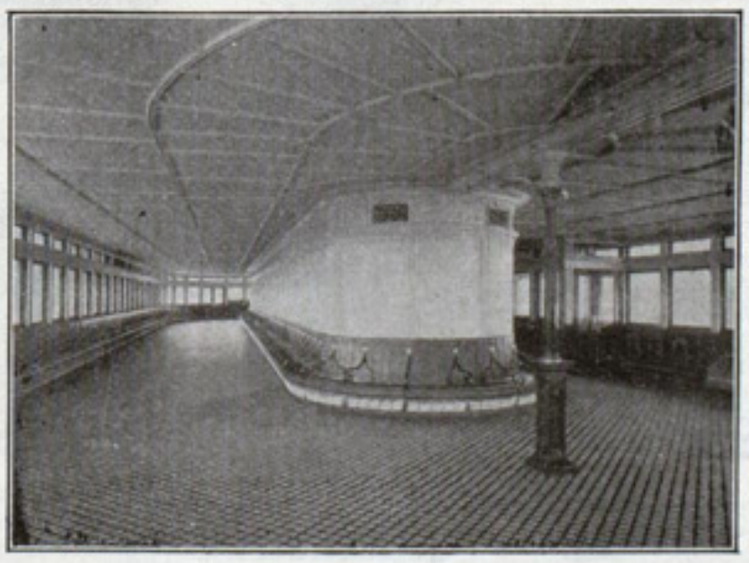
Varnish Manufacturers,

NEW YORK BOSTON PHILADELPHIA BALTIMORE
CHICAGO CINCINNATI ST. LOUIS SAN FRANCISCO

Factory and Main Office,

DETROIT.

INTERLOCKING RUBBER TILING.



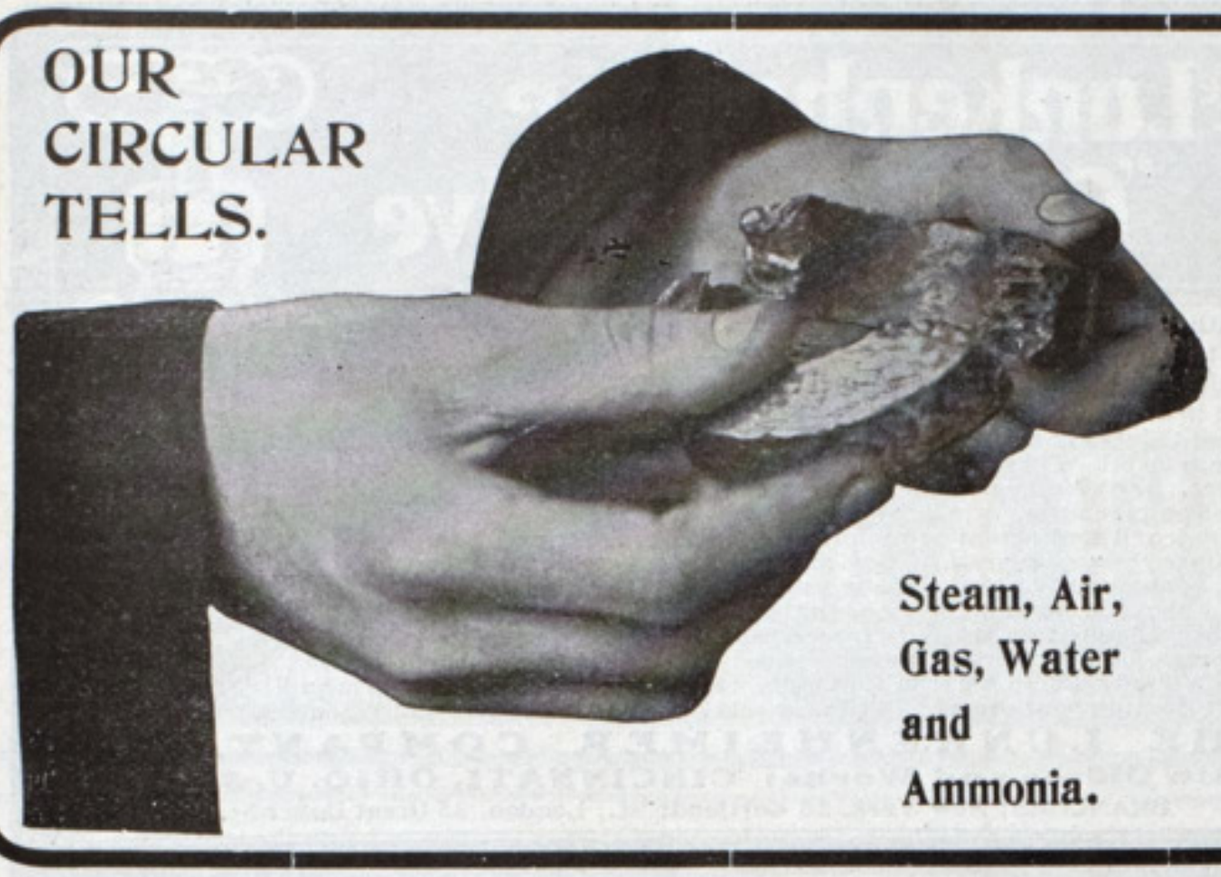
Is noiseless, non-slippery, waterproof and thoroughly sanitary, more durable than stone or earthen tiles, elegant in appearance, manufactured in a carefully selected variety of colors. Endorsed by the best architects and engineers. A perfect floor for business offices, banking-rooms, court-rooms, vestibules, halls, billiard-rooms, smoking-rooms, cafes, libraries, churches, hospitals, hotels, etc. It is especially and peculiarly adapted for Steamships, Yachts, etc. It stands the constant straining and racking without cracking or separating, and its non-slippery feature is of high value. Samples, estimates and special designs furnished upon application. Sole manufacturers.

NEW YORK BELTING & PACKING CO. Ltd.

25 PARK PLACE NEW YORK

PHILADELPHIA, 724 Chestnut St. BOSTON, 24 Summer St.
BALTIMORE, 101 Hopkins Place. INDIANAPOLIS, 229 So. Meridian St.
CHICAGO, 150 Lake St. ST. LOUIS, 411 No. Third Street.
SAN FRANCISCO, 509-511 Market St.

OUR CIRCULAR TELLS.



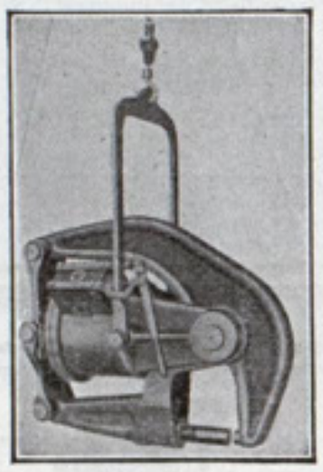
Steam, Air, Gas, Water and Ammonia.

Leaking Packing

In injectors and globe valves is a great source of annoyance. Mica is exactly adapted to this kind of work.

AMERICAN METALLIC PACKING CO.
1610 Williamson Building,
Cleveland, Ohio.

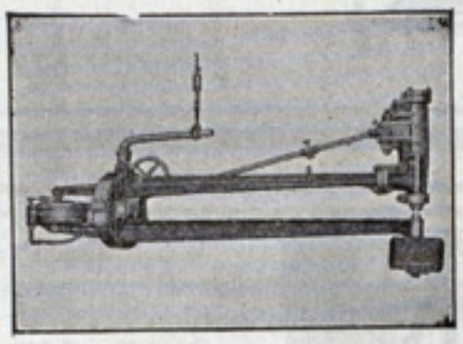
PORTABLE PNEUMATIC RIVETING MACHINES



The following concerns are using our machines:

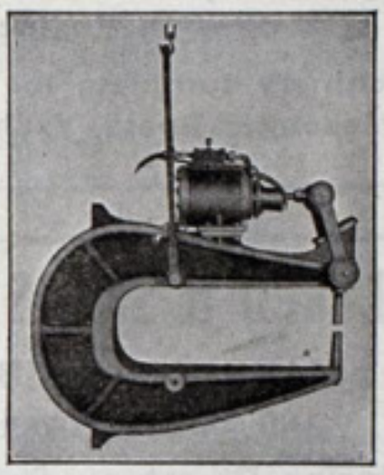
United States Navy Yard, Bremerton, Wash.

United States Navy Yard, Portsmouth, N. H.



New York Ship Building Co. Camden, N. J.

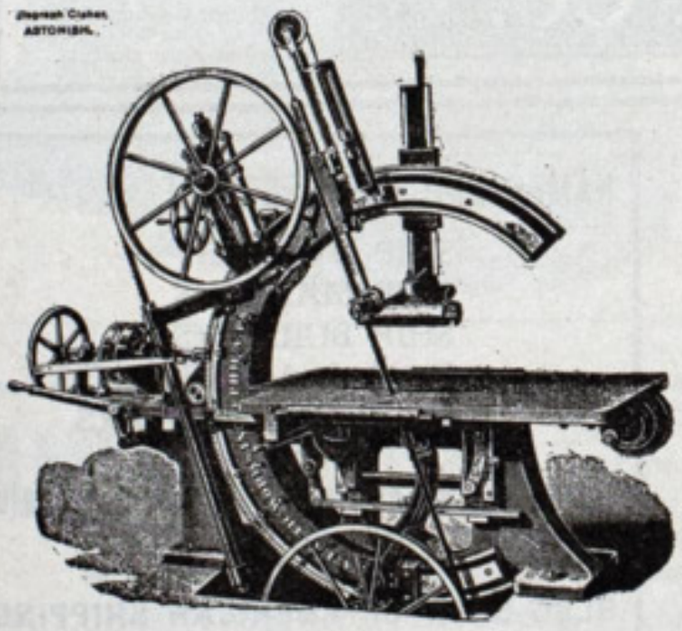
Wm. R. Trigg Co. Richmond, Va.



ESTABLISHED 1872

CABLE ADDRESS, "RIVETERS" W. U. CODE

JOHN F. ALLEN — 370-372 Gerard Ave. — NEW YORK



ADJUSTABLE BEVEL BAND SAW.
Will bevel both ways to 45 degrees.
Power Movement to change angles.
Power feed in three directions.

ESTABLISHED 1869. *INCORPORATED 1896.*

ATLANTIC WORKS INCORPORATED,

Successors to Berry & Orton Company.

2223-25-27-29 Arch St., Philadelphia, Pa., U.S.A.

MANUFACTURERS OF

MACHINERY FOR WORKING WOOD

FOR USE IN

Ship Yards, Car Shops, Railroad Shops.

SEND FOR CATALOGUE. ESTIMATES FURNISHED.

Hollow Chisel Mortisers. Car Sill Dressers.

A BINDER

In which to bind your REVIEW each week

can be had for $1 00 from **The Marine Review Pub. Co., 39-41 Wade Building, Cleveland, O.**

C. H. McCutcheon,

Copper, Tin and Sheet Iron Marine Work. Engineers' Supplies.

Brass Cocks, Globe Valves and Couplings, Iron Pipe Fittings and Supplies, Rubber Hose, Packing, Springs, Usudurian Packing.

Buffalo, N. Y.

The Blue Book of American Shipping

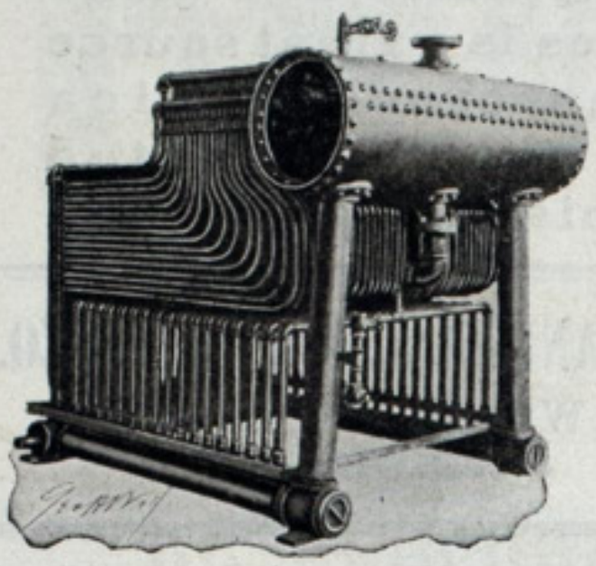
The only Marine Directory of the United States containing names and addresses of Ship Owners, Ship Masters, Ship Builders, Naval Architects, Marine Engineers and of every interest active in the Shipping Field. Also Statistics of Shipping and Ship Building in America. :: :: :: :: :: :: :: Sent on approval

Marine Review Publishing Company, 39-41 Wade Building, Cleveland, Ohio.

Price $5.00

JOHN E. THROPP & SONS CO.,

TRENTON, N. J.



Builders of the Boyer Sectional Water Tube Boiler.

Single, Compound and Triple Expansion Engines.

Machinery complete for light draft Passenger Boats, Yachts, Tugs.

ALFRED B. SANDS & SON

MARINE PLUMBERS

AND MANUFACTURERS OF

Marine Plumbing Specialties



Marine Water Closet for either above or below water line.

Folding Lavatories, Ventilators, Pumps, Tanks, &c., &c.

134 BEEKMAN ST., New York.

Chas. Cory & Son,



Manufacturers of

Mechanical and Electrical Telegraphs and Indicators.

Engine Bells and Electric Call Bells.

278-279 Division St.

NEW YORK CITY.

The Lunkenheimer "CLIP" Gate Valve



SINGLE DISC, DOUBLE SEATED

In Screw Ends, from ⅛ to 6-Inch Sizes.
In Flange Ends, from 2 to 6-Inch Sizes.

Best in quality, lowest in price, the engineer's favorite. These Valves are made of cast iron and all wearing parts of gun metal. They are superior to common, cheap brass valves. **Why?** *Because* they possess all the advantages of a cast-iron pipe fitting, are heavy and rigid—not injured by expansion and contraction or rough handling in pipe fitting. *Take pressure from either end.* Body and hub held together by a steel clip, consequently always easily taken apart. Joint between body and hub made permanent by an imbedded seamless oval copper wire washer. If you desire the *best, strongest* and *most durable* valve for general purposes, on all ordinary pressures, use this valve. *Fully warranted to satisfy.* Made also in All Iron for Cyanide and other acids. Specify them and order through your dealer. Write for catalogue. Sole Makers and Patentees,

THE LUNKENHEIMER COMPANY,
Main Offices and Works: CINCINNATI, OHIO, U. S. A.
BRANCHES: New York, 26 Cortlandt St., London, 35 Great Dover St.



NO OIL lubricant is a perfect lubricant for heavy machinery. A solid lubricant is required. No solid lubricant is at once so durable and so smooth as Ticonderoga Flake Graphite. Only Ticonderoga Flake Graphite is used in Dixon's Graphite Lubricant. Ask for booklet 77-c.

JOSEPH DIXON CRUCIBLE CO., JERSEY CITY, N. J.

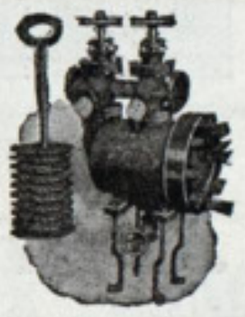
WATER FILTERS REGULATORS & ENGINES

We make **Pressure Regulating Valves** for all purposes, steam or water.

Our **Feed-Water Filter** will keep oil out of your boiler.

We can interest you if you use a condenser.

Water Engines for Pumping Organs



Keep Oil out of your Boiler with the
FEED-WATER FILTER
For Marine and Land Service
Two of these Filters are in use on the Oceanic.

THE ROSS VALVE CO. TROY N.Y.

FARNAN Brass Works

CLEVELAND, O.

23 Center St.
(near the bridge.)

OIL PUMPS, WHISTLES, GOVERNMENT PLUGS, ETC.

MARINE WORK TO ORDER.



NAMES AND ADDRESSES OF

SHIP OWNERS
SHIP MASTERS
SHIP BUILDERS
NAVAL ARCHITECTS
MARINE ENGINEERS

AND OF

Every Interest Active in the Shipping Field,

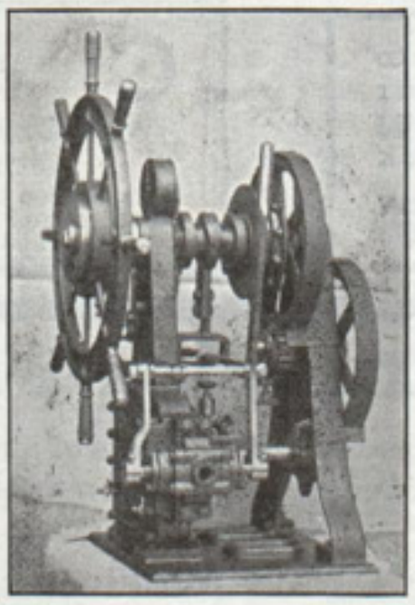
Invaluable for Circular Purposes,

Are found in the

BLUE BOOK OF AMERICAN SHIPPING.

Sent on Approval, Carriage Prepaid.

MARINE REVIEW PUB. CO., CLEVELAND, O.



THE DAKE PILOT HOUSE STEAM STEERER.

A Simple Compact and Durable Machine. Occupies Small Floor Space.

Write for descriptive circulars and prices.

MANUFACTURED BY

The Dake Engine Co.,

GRAND HAVEN, MICH.

How About Those Boilers? Are They Clean?

If you are not a user of DEARBORN COMPOUNDS and you are making some investigations regarding a Scale Remover, write us and send gallon sample of the water. (Analysis reported free to customers.) We correct Boiler Waters for the World.

DEARBORN DRUG & CHEMICAL WORKS

27-34 Rialto Building, CHICAGO, ILL. WM. H. EDGAR, PRESIDENT. Telephone Harrison 3930 and 3931



CRAIG SHIP BUILDING CO.

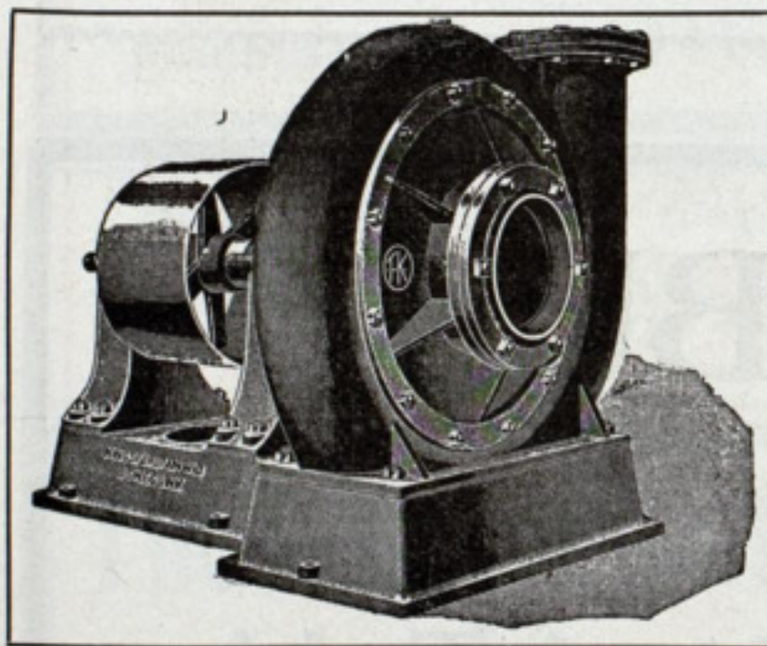
TOLEDO, OHIO.

METAL - AND - WOODEN - SHIP - BUILDERS.

New Dry Dock—450 feet long, 110 feet wide on top, 55 feet wide on bottom, 16 feet of Water on Sill.

Repairs to Metal and Wooden Ships

A SPECIALTY.



DREDGING, WRECKING CIRCULATING AND BALLAST PUMPS.

MARINE BOILERS.

Kingsford Foundry & Machine Works,

OSWEGO N. Y.

MOTT'S

"RICHMOND" PUMP CLOSET.



The "Richmond" is the simplest, quickest and easiest working Closet made. It has been endorsed by all who have seen it. We also manufacture a full line of Baths, Lavatories and other Sanitary goods for Marine Work.

The J. L. Mott Iron Works,

84-90 Beekman St., NEW YORK CITY.
332 Boylston St., BOSTON, MASS.
1128 Walnut St. PHILADELPHIA.

Our New Marine Catalogue is Now Ready for Distribution.

AMERICAN LINE

NEW YORK
SOUTHAMPTON
LONDON

CALLING AT CHERBOURG WESTBOUND.

Sailing From New York Every Wednesday at 10 A. M.

ST. LOUIS (11,629 tons), ST. PAUL (11,629 tons), NEW YORK (10,674 tons), PHILADELPHIA (10,433 tons)

Special Express Train from Southampton to London in one hour and forty minutes. Close connection at SOUTHAMPTON for Havre and Paris by special fast twin-screw Channel Steamers.

RED STAR LINE

NEW YORK
ANTWERP
PARIS

Sailing Every Saturday at 10 A. M.

FINLAND (12,760 tons), KROONLAND (12,760 tons), ZEELAND (11,905 tons), VADERLAND (11,899 tons).

One of the Shortest Routes to BELGIUM, HOLLAND, FRANCE, GERMANY, THE RHINE, SWITZERLAND and ITALY.

Send for "Facts for Travelers."

Office, Empire Building 73 Broadway, New York.

305-307 Walnut St., Philadelphia.
Fiske Building, 89 State Street, Boston.
306 F St., N. W., Washington, D. C.
Cor. Dearborn & Washington Sts., Chicago.
Third and Pine Streets, St. Louis.
10-12-14 Washington Ave., S., Minneapolis.
30 Montgomery St., San Francisco.

PIERS: 14 & 15 NORTH RIVER, FOOT OF FULTON ST., NEW YORK.



LUCAS' QUESTIONS AND ANSWERS FOR MARINE ENGINEERS

Contains 516 pages, 807 questions with carefully prepared answers.

MORE THAN A HUNDRED ILLUSTRATIONS.

PRICE, $2.00 POSTPAID

TO ANY ADDRESS. ORDER TODAY.

MARINE REVIEW PUBLISHING COMPANY
39-41 Wade Building :: :: Cleveland, Ohio.

HARDY'S S.S. METAL.

THE MOST DURABLE AND SATISFACTORY BABBITT METAL FOR MARINE SERVICE

TRADE MARK WW

HARDY - S.S. METAL -

FACSIMILE OF INGOT

HAS STOOD THE TEST OF 30 YEARS.

MANUF'D SOLELY BY WM. A. HARDY. FITCHBURG, MASS. U.S.A.

TELEPHONE WEST 244. RESIDENCE, 183 LAWN ST.

LAKE ERIE BOILER WORKS,

J. J. KEENEN & SONS, PROPRIETORS.

Boilers, Tanks and Sheet Iron Work, Coal and Ore Buckets.

REPAIRING A SPECIALTY.

Also Flues Taken Out, Placed and Reset, New Flues always in Stock.

COR. ELM AND HEMLOCK STS., CLEVELAND, O

PHOSPHOR BRONZE.

REG TRADE MARKS



THE PHOSPHOR BRONZE SMELTING CO. LIMITED, 2200 WASHINGTON AVE., PHILADELPHIA.

"ELEPHANT BRAND PHOSPHOR-BRONZE"

INGOTS, CASTINGS, WIRE RODS, SHEETS, ETC.

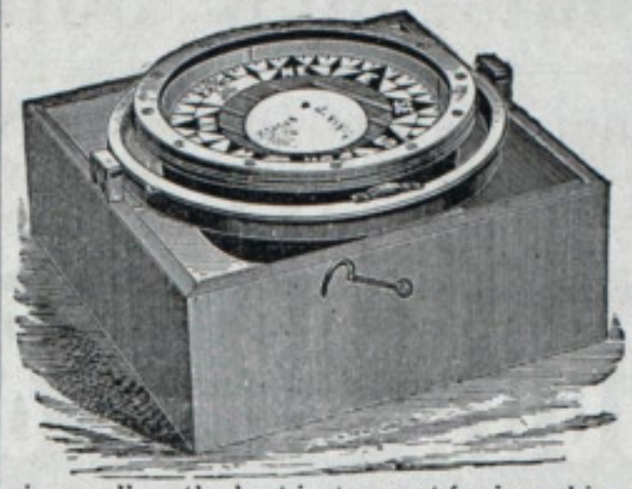
— DELTA METAL —

CASTINGS. STAMPINGS AND FORGINGS.

ORIGINAL AND SOLE MAKERS IN THE U.S.

DELTA METAL

RITCHIE LIQUID COMPASS



The Standard Liquid Compass.

Used Exclusively by the United States Navy For Over 35 Years.

Over 25,000 Used in Merchant Service.

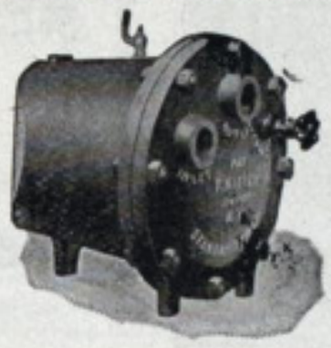
Made in all sizes and styles, from 2 to 12 inches diameter of card. All compasses made by us have our name printed below the North point, or prominently upon the card. **NONE OTHER ARE GENUINE.** Latest form with four or six needles, the best instrument for iron ships. For sale by ship chandlers and nautical instrument dealers.

CATALOGUE FREE.

E. S. RITCHIE & SONS,

Manufacturers of Nautical and Physical Apparatus,

BROOKLINE, MASS., U. S. A.



KIELEY

Standard Steam Trap

Made for Marine Work.

Also Reducing Valves, Steam Separators and expansion Traps for Marine Purpose.

SENT ON TRIAL

Good for any Pressure.

KIELEY & MUELLER

7-17 West Thirteenth St., New York WRITE FOR CATALOGUE.

NATIONAL TUBE CO.,

MANUFACTURERS OF

Seamless Cold Drawn Steel Tubing

IN ALL SIZES FROM 1-8 TO 16 in. DIAMETER.

Stay Tubes,
Water Grates,
Compressed Air and High Steam Pressures.

BOILER TUBES

FOR ALL CLASSES OF MARINE WORK.

Hollow Shafts,
Bushings,
Hydraulic Tubes,
Etc., Etc.

SALES OFFICES:

Havemeyer Building, New York.
Frick Building, Pittsburg.
Western Union Building, Chicago.
267 So. Fourth St., Philadelphia.
420 California St., San Francisco.

FOREIGN OFFICES:

Dock House, Billiter Street
London, E. C., Eng.

THE BABCOCK & WILCOX COMPANY,

NEW YORK AND LONDON.

FORGED STEEL WATER TUBE MARINE BOILERS

362,000 Horsepower in the United States Navy. 186,000 Horsepower in the British Navy.
225,000 Horsepower in the American Merchant Marine.

Recommended by Boiler Committee, appointed by Lords Commissioners, British Admiralty, for

LARGE CRUISERS AND BATTLESHIPS.

No Cast Metal.
No Bent Tubes.

No Screwed Joints.
Lightness.
Accessibility.

No Automatic Devices.
Safety Under High Pressure.

Bayonne, New Jersey, U. S. A.
Paris, France.

WORKS:

Renfrew, Scotland.
Oberhaussen, Germany.

For High-Grade Installations in the Navy and Merchant Marine

THE NICLAUSSE BOILER

609,000 Horse Power in the Navies of

ENGLAND, UNITED STATES, FRANCE, GERMANY, JAPAN, RUSSIA, ITALY, SPAIN, TURKEY, CHILE, ARGENTINE REPUBLIC.

105,000 HORSE POWER IN THE UNITED STATES NAVY.

Manufactured by THE STIRLING COMPANY, CHICAGO, ILL.

Screw Propeller Computer

(McDERMOTT)

For quickly determining dimensions and proportions of screw propellers for any set of conditions.

$5.00

The Roberts Boiler Co.

Has Built Nearly 1,500 Boilers to Date.

For Launches, Yachts, Passenger and Freight Steamers,
Dredges, Tugs, Stern-wheelers, Canalers;
Also for Navy Department, War Department, Treasury Department,
Light-House Board and Revenue Cutter Service;
Also for N. Y. Dock Department and U. S. Supervisor, Harbor of N. Y.

SAFETY AND ECONOMY.

Never killed a man or had a serious accident. $250,000 capital. Works covering 29,000 square feet of ground. Never had a boiler returned on account of dissatisfaction. Every boiler warranted. All material made specially for our use. All boilers tested at 500 pounds hydrostatic pressure and 250 lbs. of steam before shipping. Workmanship strictly first-class. All joints screwed and reliable. No expanded joints. State your requirements and we will furnish specifications. Correspondence solicited.

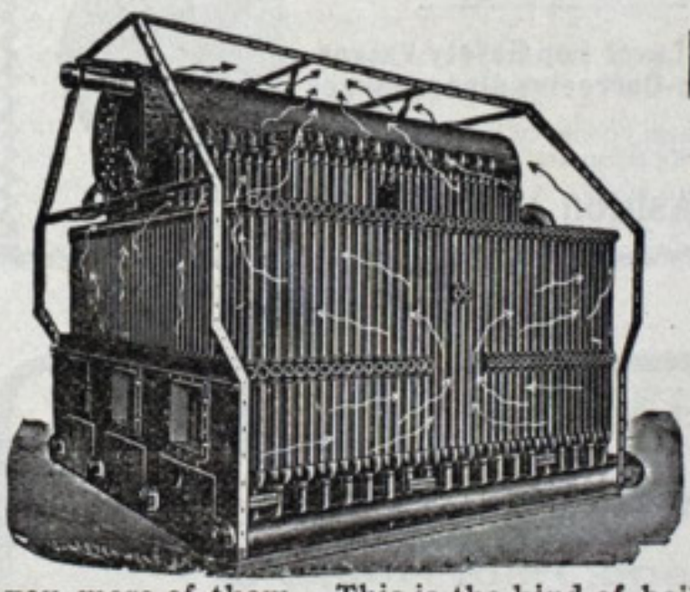
The Roberts Safety Water-Tube Boiler Co.

Works, Red Bank, N. J.

39 and 41 Cortlandt St., NEW YORK CITY.

TELEPHONE: { NEW YORK OFFICE, 599 CORTLANDT. / OFFICE OF WORKS, 49 RED BANK, N. J. } Cable Address, "BRUNIVA, N. Y.

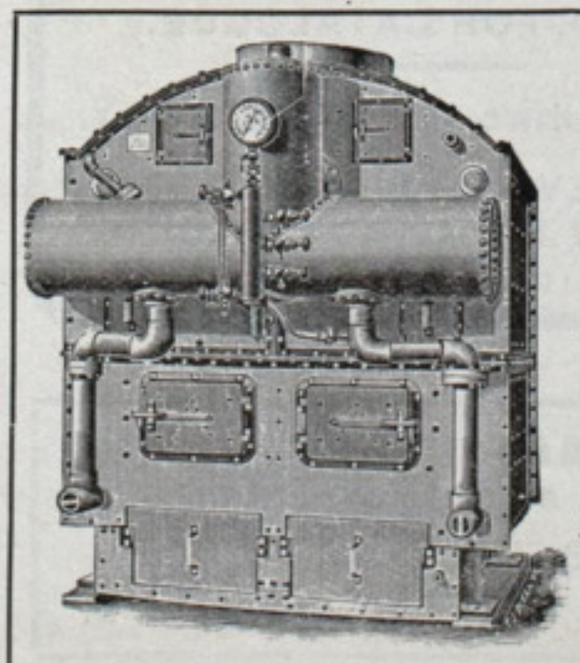
It's Easy to Catch Your Eye



But we want you to think. The Taylor Water Tube Boiler is daily proving itself the most economical and durable boiler on the market. Light, compact, powerful, it never primes and carries as steady a water line as a Scotch Marine. Look at the cut and notice the good points; then write us and we will show you more of them. This is the kind of boiler you can use 24 hours a day year in and out. Just the thing for that new tug.

TAYLOR WATER TUBE BOILER CO.,

400 Franklin St., DETROIT, MICH.



250 STEAM VESSELS

NOW EQUIPPED WITH

ALMY'S PATENT SECTIONAL Water-Tube Boilers

BEAR EVIDENCE OF THEIR

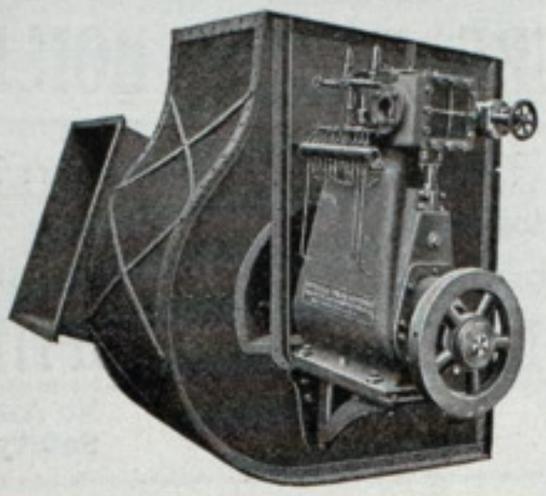
Excellent Qualities

ALMY WATER-TUBE BOILER CO.

PROVIDENCE, R. I.

Buffalo Steel Plate Fans

for Forced Draft and Ship Ventilation.



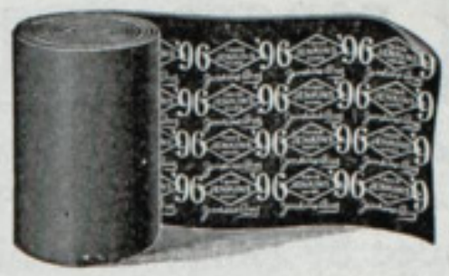
Operation Positive and Uniform Regardless of Weather Conditions

Write for Catalogue

Buffalo Forge Company
BUFFALO, N. Y.

JENKINS '96 SHEET PACKING

The Perfection of Joint Packing.



Cheapest and Best in the Market.

Makes joints instantly that will be perfectly tight for years on any and all pressures of steam, ammonia, oils, acids, etc. Does not deteriorate with age. **Weighs less,** therefore cheaper than any other packings sold at equal price per pound. Send for sample and give it a test.

JENKINS BROS., New York, Philadelphia, Chicago, Boston.

The Shipowners Dry Dock Co.,

CHICAGO.

Repairs to Steel and Wooden Vessels. ‖ **Three Docks at Halsted Street and North Branch.**

OFFICES, RIALTO BUILDING.

OFFICE TELEPHONE, HARRISON 1020.
YARD TELEPHONE, NORTH 1659.

W. W. WATTERSON, Supt.
TELEPHONE, LAKEVIEW 198.

ASHTON



Cam Lever Pop Safety Valves and Non-Corrosive steam gauges



give highest efficiency and durability.
Specify them and get the best.

The Ashton Valve Co., Boston, New York and Chicago, U. S. A.

THE BOURNE-FULLER CO.

IRON, STEEL and PIG IRON.

Cleveland, O.

Tool Steels for Quarries, Mines, etc.
Please let us know your requirements.

GENERAL ELECTRIC COMPANY'S PROJECTORS.



Hand, Pilot House or Electrical Control

Operated from Direct-Current Incandescent Lamp Circuits.

WRITE FOR CATALOGUE.

General Office, Schenectady, N. Y.

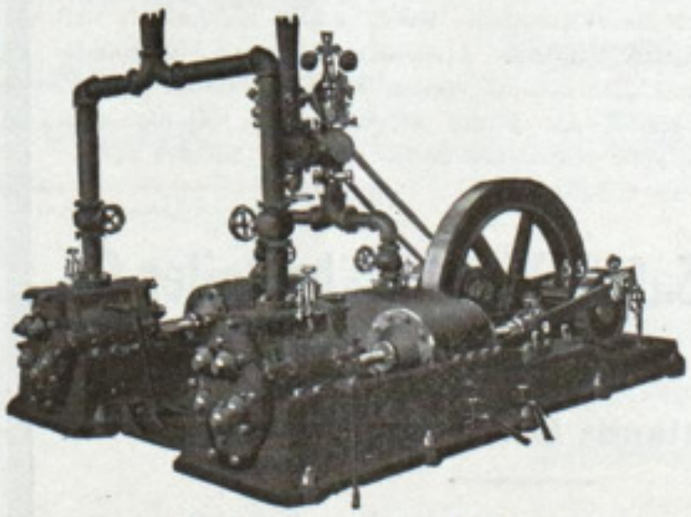
CLEVELAND OFFICE, 310 NEW ENGLAND BUILDING.

13-INCH PROJECTOR. HAND CONTROL.

Sales Offices in All Large Cities.

CHICAGO PNEUMATIC TOOL CO.

General Offices: Fisher Bldg., CHICAGO. Eastern Office: 95 Liberty St, NEW YORK.



PNEUMATIC LABOR SAVING MACHINERY OF EVERY DESCRIPTION.

Complete Air Plants Installed.

Write for Catalog.

Air Compressors Built in all Capacities.

Hand Book of ADMIRALTY LAW
By Robt. M. Hughes.
$3.75.
Marine Review Pub. Co., - - Cleveland, O.